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POPULAR Computing WEEKLY

35p 25-31 August 1983 Vol 2 No 34

This Week

Electron review
Keith and Steven Brain take a critical look at the Electron and compare it with its more famous elder brother — the BBC micro See page 14

Premier
David Kelly talks to Premier Microsystems about its Dragon disc drive on page 13

Noughts and crosses
Chris Mourhouse presents a simple noughts and crosses game for the Dragon 32 See page 25

New releases
All the latest software games including *Arena III* from Lizard Games and *Battle of Britain* from Maincomp See page 45

★ STAR GAME ★
Barrels & Ladders on 16K Spectrum. See page 10

News Desk

NewBrain company crashes

GRUNDY Business Systems manufacturers of the £234 NewBrain micro, has gone into liquidation.

The company becomes the first major micro manufacturer to collapse

G Wheeler, Grundy's financial director blames the crash on a severe liquidity crisis"

For some time prior to the crash, NewBrain had kept a low profile and a number of future projects — such as compiled Basic for the machine — had to be shelved The design team had also been cut — with only one of the original six development engineers being retained

The NewBrain had a chequered career Originally designed by Clive Sinclair the project went first to the National Enterprise Board and the Newbury Laboratories before being bought by Grundy Finally launched in May last year the machine featured only a black and white display

Continued on page 5

The Mirror plans a launch into software

EXCLUSIVE

THE *Daily Mirror* newspaper is to enter the software industry

The national newspaper plans to launch a range of titles for the Spectrum Dragon and BBC machines in November

Its development team — Jim MacKonochie Bernard Grant and Richard Bolton — has been talking to a number of software houses over a period of months

Those tentatively approached include Psion, Melbourne House Quicksilva and Automata

The idea is that new software would be specially commissioned by the *Mirror* and sold under its own label

But, *Daily Mirror* development manager Jim MacKonochie denied that plans to sell software were far advanced "People are putting two and two together and getting three As a company we are always showing interest in publishing ideas — particularly in areas of new technology "

Quicksilva's managing director Rod Cousins, however-

Continued on page 5



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★ ★ WIN A LYNX — SEE PAGE 35 ★ ★



25-31 August 1983 Vol 2 No 34 SUNSHINE

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Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week

Editorial

The Right Stuff by Tom Wolfe is a book which tells the true story behind the US manned space programme. It details the lives of the astronauts and their families with chilling precision.

It is hard for anyone in the UK to imagine the awe with which astronauts were regarded in the US during the 1960s. The Russians had stolen a march on the Americans first with the launch of the Sputnik, then on April 12, 1961, with the first manned orbit of the Earth by Yuri Gagarin in Vostok 1.

The astronauts selected for NASA's spaceships were seen not only as challenging Russia's dominance of space, but also as representing everything that was good about the American way of life. The first seven astronauts, and John Glenn in particular, took on a status somewhere between film stars and messiahs.

However, as *The Right Stuff* explains, behind the apple-pie image, the astronauts had as many human frailties, rivalries and fears as anyone else. They were special certainly but they did not all leap from the same 'crew-cut all-American boy mould as the media would have had you believe.

The Right Stuff not only tells you what it takes to become an astronaut, it also tells you what it was 'really like to be an astronaut.

Movie buffs may like to know that film rights to the book have been bought by Chartoff-Winkler and United Artists.

Next Thursday

Rescue the damsel from the castle, but avoid the evil knight. Damsel in Distress, next week's star game for 16K or 48K Spectrum by Richard Bartlett.

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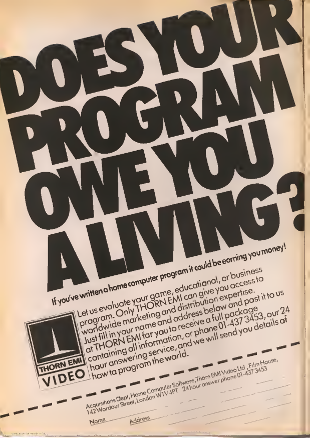
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Software on cable from W H Smith

W H SMITH has announced it is to set up a new Cable Services Division, with the main intention of distributing games software by cable

The service is planned to begin sometime in 1984 and is the result of a tie-up between W H Smith and an American company, The Games Network

The Games Network operates a cable video games service in Los Angeles and the Smith venture involves bringing that facility to the UK and Eire

This will mean that to begin with, games offered on the system will be of American origin. It is hoped however, that as the scheme proceeds, software from British software houses will also be included

The format of The Games Network is that of a top 20 games list which is regularly up-dated each month

Subscribers will be supplied with a special games console with keyboard and internal memory — rather like a low-cost home micro — with which to play the games. At present, US subscribers to the Games Network pay about £10 a month for the service

One advantage of the system is that in principle, it can allow two-way communication with Smith's host computer opening up areas such as multi-player interactive games armchair-shopping and tele banking

Francis Baron, former chief executive of Guthrie International, has been appointed managing director of the new W H Smith cable division

Psychology of language

MICHAEL Gruneberg, a senior lecturer in psychology at Swansea University has concluded an extensive series of deals for his language learning software

His courses designed to teach French German, Spanish or Italian, are based on psychology rather than linguistics

The series are designed to provide the holidaymaker or business person with a basic grounding and vocabulary of about 400 words

His programs — the Gruneberg Linkword Language Courses will go into the following machines BBC/Electron(Acornsoft) Commodore 64/Vic20 (Audiogenic) Dragon (Dragon Data) Spectrum (Silversoft), Lynx (Camsoft), Atari (English Software) and Oric (Tansoft)

Mattel chops costs

MATTEL has chopped the cost of the 16K Ram expension for its new £79 Aquarius home micro

The price comes down from £49 95 to £29 95. The cost of the 4K Ram expansion remains unchanged at £19 95

Yet even so, Mattell is under pressure from dealers to reduce prices further

Silica Shop, the Kent-based computer shop, is selling the 20K combination of Aquarius and 16K Ram pack for only £99 Commented Silica Shop's John Arundel "It is a good machine, but with only 4K we thought people wouldn't look at it With 20K it makes a more attractive package

Electron head start for Smiths

W H Smith has gained a head start on its High Street rivals by tying up a deal to sell the Acorn Electron

Over 100 of their shops will begin selling the £199 machine in mid September

See the Electron review page 14

Mirror launch

Continued from page 1

er, confirmed *Popular Computing Weekly's* investigations "Yes, we have spoken with the *Daily Mirror* but in principle we would be against publishing games for anybody other than in our own identity"

NewBrain crash

Continued from page 1

A new Grundy research laboratory was opened in Cambridge by Information Technology Minister Kenneth Baker in August last year

A disc system announced recently for the NewBrain — giving access to the wealth of CP/M software — appears to have come too late to save the machine

Sweltering ZX fair

DESPITE being held at the height of the summer holiday season, the Eighth ZX Micro fair still managed to attract a healthy attendance. Almost 7,000 people — slightly down on last time — braved the sweltering heat inside London's Alexandra Pavilion last Saturday

Although there was little new on display — most companies are holding back for the *Personal Computer World Show* in September — what was there was interesting

With no Microdrives on show on the Sinclair stand — let alone on sale — those wanting a mass storage option for the Spectrum could choose the £74 disc interface from Technology Research Either standard 5¼ inch discs to accompany the interface (single £230 double £389) or a package including the Hungarian MCD-1 3 inch drives complete with interface (twin £327) was possible

East London Robotics previewed a £39 electrocardiograph the *Ticker Tracer* to enable you to watch your heart working away

Micronet 800 appeared at a ZX Fair for the first time, now that its Prism Spectrum modem is available

On the debit side several of the better known companies failed to put in an appearance — including Artic, Silversoft, Imagine and Computer Rentals. In part compensation, three companies were present for the first time McGraw Hill, Arcade and Blaby

As far as Spectrum was concerned, interesting bits and pieces included *Apocalypse* a wargame simulation from Redshift, *Draw*, a graphics utility from Melbourne House *Bedlam* from AWA, *The Dungeon Master* from Crystal Computing *Logix* from Virgin Games

World first for Philips TV

PHILIPS claims its CS3890 26in colour television is a world first

It is a teletext compatible tv with built in thermal printer At the touch of a button the machine will provide a 100 × 75mm print-out of any teletext page

Available now the set will sell for around £699 – the price including three rolls of printer paper

Microdrive latest

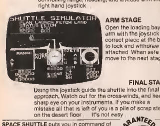
POPULAR Computing Weekly has still not received its two ZX Microdrives ordered on July 29

Latest moves in the Microdrive saga are Cheque cashed by Sinclair Research on August 10 Acknowledgement of order received on August 10 Days since order 28

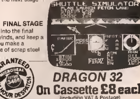
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Crashing program

I think I have found a genuine bug in the Spectrum game *Jetpac*. On several occasions when I have achieved high scores the program crashes and is wiped clean from memory. My high score at the moment is 118 700, but I still had two men. Is this the fault of the program or is it my computer?

Philip Shnn
80 St Johns Ave
Obelisk Rise
Northampton NN2 8RU

Since my high score on Jetpac is considerably lower, I'm afraid that I have no idea whether the program or the computer is at fault. Perhaps our readers will let us know if they have had any problems with Jetpac.

Fingers twitching

Has Sir Clive failed to realise the awesome implications of his latest move — introducing that infernal Microdrive? Can he be so thoughtless?

Thousands of Spectrum owners are now lying awake in their padded cells unable to sleep. They can only stare vacantly into space, fingers twitching in the terrible knowledge that Artic can now write their next adventure (appropriately *F*) using 100K of Ram!

What hope is there for us?

Clive, I ask you on behalf of us all to withdraw this device before it's too late.

S Rhodes
105 Crosslands
Caddington
Luton
Beds

Designer bug

Designer by Andrew Roberts was a welcome rare appearance of a useful program for the Oric (*PCW* 4-10 August).

However, the program as printed had a bug in line 220 which prevented the redefined character from being stored in Ram. Since the variable *Tch(A)* is set to zero in line 200, anything by which it is multiplied in line 220 must be zero, thus effectively erasing the character from memory.

Line 220 should therefore read

```
IF CH(8,A)=1 THEN TCH(A) =
  TCH(A) + (2^(8 - B))
```

N Price
8 Pinewood Close
Gerrards Cross
Bucks

One letter ahead

In a footnote to Graham Marsden's letter (about IBM and HAL, *PCW* 11-17 August), you challenge readers to demonstrate the odds against the coincidence of "one letter ahead".

Well, I don't know what the odds are and I would have thought it depended on how you define the event. However, about 30 years ago, a certain Cedric Allingham wrote a book in which he alleged he'd communicated with some Martians whilst hiking in the Scottish Highlands. The only word of Martian Cedric offered his readers was "*gwl*", meaning "yes".

Being more than a mite sceptical, I tried a "so many letters past 'yes'" calculation to see whether that was how he arrived at the word. Well, it very nearly works out (if you carry on beyond Z, starting at A again) as your readers should be able to calculate, even without a computer. But, while working on my rather uncharitable theory, I discovered that the French "oui" is exactly 16 letters past "yes".

That'll teach me not to believe in Martians!

A W Rowe
69 Longley Lane
Huddersfield HD4 6PR

A coincidence by any other name, eh? I'm still not quite sure how we progressed from *HAL* to believing in Martians, but you have got to admit it's a heck of a theory.

Planetoids megascore

Being a 16K Spectrum owner — four times owner having possessed three faulty Spectrums before my current model (so far so good) — I was extremely interested in the *Hungry Horace* saga. I have now found a flaw in *Planetoids* which has given me a megascore of 404,500. Can anyone beat it?

Patrick Sharkey
89 Chase Side
Enfield
London

Verify command

In response to a question from Andy Young (*PCW* 11-17 August), Ian Beardsmore suggested that the closest to a verify command on the BBC micro was *Cat. I should like to describe a better solution:

```
*LOAD "" 8000
```

Once the program has been saved, this command will try to reload it as normal but into Rom (*8000+ hex*) and not into Ram, leaving the original program intact. The advantage being that all errors are checked — including the block zero bug — unlike **Cat* — and, if the program does not **Load* correctly, it can be resaved from Ram as normal.

I should also like to put in a plug for our local BBC user group which meets on the third Monday of each month in the Computer Room (above main entrance), Lord Lawson School, Portobello Road, Birtley, Co Durham. The next meeting will be on 19 September.

Finally, thanks to Jeremy Ruston for his interesting assembler series, although a few more examples would be nice.

Gary Alderson
30 Windsor Road
Birtley
Chester-le-Street
Co Durham DH3 1HY

Altered sound waves

I was interested to try out Steve Lanthrope's program *Sound Waves* for Spectrum (*PCW* 4-10 August, 1983).

I enclose some slight alterations to his program that offer a more realistic type of sound waveform as might be seen on an oscilloscope, with colour added — the colour can be removed by substituting in Line 75: *Paper 0: Ink 7: Border 0*.

Program 2 offers a variation on this.

Both programs obtain their *Sound* input from the computer, and therefore need no external signal.

N W Scott
18 Harrop Road
Hale
Altrincham
Cheshire WA15 9BZ

ANIROG

Anirog with the help of the Countries Top Software Writers, bring you a new High Standard of games until now only available on Arcade Machines.
These Spectrum and Commodore 64 games are unquestionably superior and have already won highly acclaimed praise by all who have tested them.

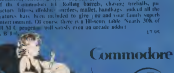
SCRAMBLE 64

[illegible] your rocket space ship through the six sectors leading to [illegible] command module. You will have to destroy the ground to air rocket installations, mysterious ammo [illegible] fuel dumps and dodge in between indestructable plasma bolts. You will [illegible] to navigate through the maze over the city under constant attack by the cobrons this 34K all M/C program has fully [illegible] all the qualities of this superb machine
[illegible] only £7.95

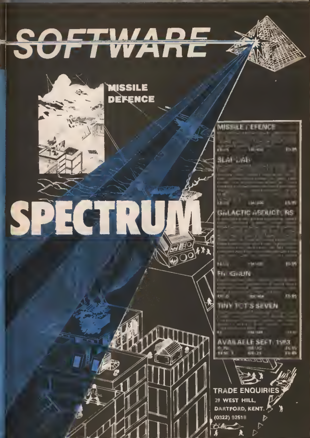


KONG 64

A four screen [illegible] of everybody's favourite with superb animation, brilliant graphics and full use of the sprite capabilities of the Commodore 64. Rolling barrels, chasing fireballs, [illegible] factory lifts scaffolding girders, mallet, handbags indeed all the features have been included to give you and your family superb entertainment. Of course there is a Hi-score table. Nearly 30K of all M/C program will satisfy even an arcade addict
K.B. [illegible] £7.95



Commodore 64


SOFTWARE
MISSILE DEFENCE
SPECTRUM
MISSILE DEFENCE
GALACTIC ABDUCTORS
TINY TOTS SEVEN
AVAILABLE SEPT. 1983
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DARTFORD, KENT.
(0322) 92518

Barrels and Ladders

A new game for 16 or 48K Spectrum by David Millington

Barrels and Ladders will run on either Spectrum The play area consists of four floors interconnected by ladders You control a man who has to rush from floor to floor collecting the red barrels that are lying around and pile them up on the light blue platform on the bottom floor Only one barrel can be carried at a time Your task is made much more difficult by the patrols of green monsters which wander back and to trying to cut you off They cannot be killed but must be avoided at all costs

At the beginning of the game you have three lives A time line is shown at the top of the screen and the score awarded for each barrel collected is based on the time remaining Of course if time runs out you will lose a life When all 12 barrels have been collected the game progresses to a second more difficult level and so on Your man is controlled using the left and right cursor keys and the '0' key to climb and descend ladders You should have no trouble in beating my high score of 1083

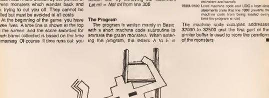
Finally if you want to make the game harder still try removing the statement *Let mf = Not mf* from line 305

The Program

The program is written mainly in Basic with a short machine code subroutine to animate the green monsters When entering the program, the letters A to E in quotes should be taken as the corresponding graphic character

100-150	Move man along floors and pick up barrels
200 260	Climb/descend ladders
280 310	Decrement time and move monsters
400-430	Add barrel to pile and increase score
435-510	Next sheet
700-730	Lose life and end of game
1000 1050	Draw screen
2000 2500	Set up variables and initial positions of monsters and barrels
9500-9580	Load machine code and UDG s from data statements (note that line 1000 prevents the machine code from being loaded every time the program is run)

The machine code occupies addresses 32000 to 32500 and the first part of the printer buffer is used to store the positions of the monsters ■



TIME SCORE 0

```
   1 REM ***********************
   2 REM * BARRELS AND LADDERS *
   3 REM * © D.MILLINGTON 1983 *
   4 REM ***********************
   5
   6
  10 GO TO 1000
 100 IF ATTR (l,x)<>56 THEN GO TO 700
 105 IF INKEY$="" THEN FOR i=1 TO 30: NEXT i: GO TO 300
 110 PRINT AT l,x;" ": IF bf THEN PRINT AT l-1,x;" "
 115 IF lf THEN PRINT AT l,x; INK 1,"A": IF bf THEN IF ATTR (l-2,x)=57 THEN PRINT AT l-1,x; INK 1;"A"
 120 LET x1=x+(INKEY$="8")-(INKEY$="5")
 121 IF l=20 THEN IF x1=28 THEN LET x1=x
 122 IF bf THEN IF ATTR (l,x1)=60 THEN LET x1=x
 123 LET x=x1
 125 IF x=-1 OR x=32 THEN LET x=x-SGN x: GO TO 700
 130 LET lf=0: IF ATTR (l,x)=57 THEN LET lf=1
 135 IF INKEY$="0" AND lf THEN GO TO 200
 136 IF ATTR (l,x)=60 THEN GO TO 700
 137 IF ATTR (l,x)=58 THEN LET bf=1: LET a$="E": BEEP .05,0: BEEP .05,40: BEEP .05,10
 140 PRINT AT l,x;a$: IF bf THEN PRINT AT l-1,x; INK 2;"D"
 145 BEEP .03,20-l
 147 IF bf THEN IF l=20 THEN IF x=25 THEN GO TO 400
 150 GO TO 300
 200 LET z=USR 32000
 205 IF ATTR (l-1,x)=57 THEN FOR i=l TO l-4 STEP -1: GO TO 220
 210 IF ATTR (l+1,x)=57 THEN FOR i=l TO l+4
 220 PRINT AT i,x;a$
 230 BEEP .03,20-i
 240 PRINT AT i,x; INK 1;"A"
 250 NEXT i
 260 LET l=i: GO TO 140
 300 DRAW INVERSE 1; INK 8;-1,0: LET ti=ti-1: IF ti<=0 THEN PRINT AT 1,0; FLASH 1;"TIME UP": GO TO 700
 305 BEEP .02,INT (PEEK 23672/8): LET mf=NOT mf: IF mf THEN LET z=USR 32000
 310 GO TO 90
 400 LET ba=ba+1: READ i,z: PRINT AT i,z; INK 2;"D";AT l-1,x;" ": LET bf=0: LET a$="B"
 410 DATA 20,26,20,27,20,28,20,29,20,30,20,31,15,30,15,29,15,28,15,27,15,29,15,26
 415 LET sc=sc+ti*(no/2-3): PRINT AT 0,26; BRIGHT 8; PAPER 8;sc
 420 BEEP .2,5: BEEP .2,10: BEEP .2,3
 425 PLOT 40,163: DRAW INK 1,160,0: LET ti=160: PLOT INVERSE 1; INK 1;201,163
 430 IF ba<12 THEN GO TO 300
 435 PRINT AT 1,0; PAPER 1; INK 7;" WELL DONE,BUT YOU WON'T ESCAPE               US NEXT TIME...",,
PRINT
 440 FOR i=12 TO 23 STEP 2
 450 FOR j=-4 TO 3: LET z=USR 32000: BEEP .1,i+4-ABS j: NEXT j
 460 NEXT i
 470 FOR i=60 TO -30 STEP -3: LET z=USR 32000: BEEP .04,i: NEXT i
 500 LET no=no+2
 510 GO TO 1002
 700 PRINT AT l,x;a$: IF bf THEN PRINT AT l-1,x; INK 2;"D"
 705 RESTORE 710: FOR i=1 TO 10: PRINT OVER 1;AT l,x; INK i/2;a$: READ p: BEEP .1,p: NEXT i
 710 DATA 2,3,1,2,3,0,2,3,4,3
 715 PRINT #0;AT 1,(l2*2-1;" ";#2,: LET l2=l2-1: IF l2>0 THEN LET z=USR 32000+USR 32000: GO TO 2275
 720 PRINT INK 3;AT 2,7;"YOU GOT ";ba+6*(no-8);" BARREL"+("S" AND ba<>1)
 725 FOR i=0 TO -50 STEP -5: BEEP .2,i: NEXT i
 728 PRINT AT 10,0; BRIGHT 1;"PRESS ANY KEY TO PLAY AGAIN  "
 730 PAUSE 0: RUN
1000 IF PEEK USR "a"<>129 THEN GO SUB 9500
1001 LET a$="B": LET l2=3: LET no=8: LET sc=0
1002 PAPER 7: INK 0: BRIGHT 0: FLASH 0: OVER 0: INVERSE 0: BORDER 6: CLS : PRINT AT 0,20; PAPER 6; BRIGHT 1;"SCORE ";sc
1003 FOR i=6 TO 21 STEP 5: PRINT AT i,0; INK 3;"                                ": NEXT i
1004 PRINT INK 5;AT 21,25;"   ";AT 20,26; INK 2;
1005 RESTORE 1060
1010 FOR j=1 TO 8
1020 READ x,y
1030 FOR i=y TO y-5 STEP -1: PRINT AT i,x; INK 1;"A";: NEXT i
1040 NEXT j
1060 DATA 7,20,22,20,12,15,27,15,21,10,7,10
2010 LET bf=0: LET mf=1: LET ba=0
2020 FOR i=1 TO l2: PRINT #0;" B ";: NEXT i
2100 DATA 15,1,10,29,5,1,5,27
2110 FOR i=1 TO 4: READ y,z
2120 PRINT INK 2;AT y,z;"DDD"
2130 NEXT i
2150 RESTORE 2100
2190 POKE 32004,no
2200 FOR i=0 TO no-1
2210 LET l=INT (i/(no/4))*5+5: POKE 23296+i*2,l
2220 LET x=INT (RND*22)+3
2225 IF l=20 THEN IF x>=20 AND x<=24 THEN GO TO 2220
2230 IF ATTR (l,x-1)+ATTR (l,x)+ATTR (l,x+1)<>168 THEN GO TO 2220
2250 POKE 23297+i*2,x+128*(x<16)
2255 PRINT AT l,x; INK 4;"C"
2260 NEXT i
2270 LET lf=0: LET l=20: LET x=22
2275 IF ATTR (l,x)=57 THEN LET lf=1
2278 PRINT AT l,x;a$
2280 RESTORE 410: FOR i=1 TO ba: READ p,p: NEXT i
2300 PRINT AT 1,0;"TIME   ": PLOT 40,163: DRAW INK 1,160,0: PLOT INVERSE 1; INK 1;201,163
2310 LET ti=160
2400 PRINT AT 2,11; FLASH 1;"GET READY"
2405 FOR i=1 TO 150: NEXT i
2410 PRINT AT 2,11;"         "
2500 GO TO 100
9500 RESTORE 9510: FOR i=USR "a" TO USR "e"+7: READ x: POKE i,x: NEXT i
9510 DATA 129,129,255,129,129,129,255,129,60,60,24,126,153,24,36,66,102,60,126,153,255,60,36,195,60,66,255,129,255,129,66,60,189,189,90,60,24,24,36,66
9515 FOR i=32000 TO 32150: READ x: POKE i,x: NEXT i
9520 DATA 33,0,91,0,0,187,62,22,215,126,79,35,215,126,230,31,215,62,16,215
9530 DATA 62,0,215,62,32,203,118,40,10,62,16,215,62,1,215,62,144,203,182,215
9540 DATA 126,230,120,7,254,1,40,2,62,255,87,126,230,31,130,95,71,205,130,126
9550 DATA 254,80,32,3,123,130,95,87,205,130,126,254,67,32,2,203,246,123,130,71
9560 DATA 205,130,126,254,60,40,11,123,254,0,40,6,254,31,40,2,24,4,120,238
9570 DATA 128,119,120,230,192,170,119,62,22,215,121,215,126,230,31,215,62,16,215,62
9580 DATA 4,215,62,148,215,35,193,16,132,201,229,197,121,15,15,15,79,230,224,160
9590 DATA 111,121,232,3,230,88,103,126,193,205,201
9600 RETURN
```

A claim to fame

***David Kally** talks to Peter Rihan and John Hooker of Premier Microsystems*

Premier Microsystems claim to fame is that it has produced the first disc system for the Dragon 32 — considerably in advance of Dragon Data s own

The company was formed almost three years ago by John Hooker and Michael Bedford The pair began by writing software for the Casio 502P programmable calculator Then came material for the UK101 and Tandy machines

Peter Rihan, who is now chairman of the company joined as a hardware expert and helped develop a range of add-ons for the UK101 and Tandy

When the Dragon was announced a year ago its similarity to the Tandy Color Computer put Premier in a good position to support it Says John ' We saw the opportunity and grabbed it

Premier is now heavily involved with the Dragon Data machines — as a dealer and recognised service agent and more importantly, as the designer and manufacturer of a range of hardware and software add-ons utilities and games

First reactions to the Dragon 32 last August were favourable — a nice modern processor a good keyboard well built internally and says John "We got a constant supply of them from day one

At that time the graphics were decent — not perfect by a long way — but decent. Also the Dragon had 32K

In the pipeline

"We felt at the time that the only real competition for it was the BBC B and Dragon has now sold upwards of 100 000 machines '

Premier realised that with its keyboard, the Dragon had the potential to be a small business system Peter and John had already developed the Rom Dos and Vortex disc systems for the UK101 so the idea of designing and manufacturing their own disc system for the Dragon didn t seem too impossible

When we first went with the Dragon we talked to Dragon immediately about a disc system " says Peter "They said they were in the pipeline — and due in October Then in September it transpired that the disc drives had been delayed so we began preliminary work

When nothing had appeared by the following year we decided to go ahead and produce our own system Premier set a deadline of March because at that time the Dragon drives were planned for April John and Peter tried to go for a professional system which could compare favourably with the best of the disc systems that operate using an extension of the existing Basic

While working on the disc system they realised that the Dragon needed an assembler/editor Nothing had materialised by the time one was needed so John wrote his own assembler/disassembler/monitor — called *Encoder 09*

The Premier Delta disc system has now been on the market for over five months and in that time, close on 1 000 of the units have been sold — getting on for one percent of Dragon owners John reckons this may have seriously damaged the impact that Dragon s own disc system will have — when it is launched

At present the Delta disc system uses Canon drives but Premier will soon sell a system based on Teac half-height drives — hopefully at around the same price

A double-density system is also planned It will be launched in September in conjunction with disc manufacturer and distributor Cumana

To support the two Delta disc systems, Premier has commissioned a range of software packages — *stock control, data base management* and *accounting*

Premier also plan to sell a complete system comprising Dragon monitor, printer disc drive and software — all for well under £1 000

John has just finished writing a Dragon *Toolkit* cartridge which will give the machine 36 extra Basic commands It will incorporate a full screen editor eight programmable keys more low res graphics commands global search and replace *Goto n* where *n* is a variable page commands for listing on-screen and graphics handling to store and call up to 24 different screens of graphics

More and more, our software is veering away from games, says John ' towards utilities I m quite convinced that the *Toolkit* program will outsell any of our games in the first week

Next comes a sprite graphics board hardware/software combination giving the Dragon 16 colours and 32 moveable shapes up to 32 × 32 characters in size This is planned for September and will cost £99 95

Minstrelle is another project — a six voice stereo sound card Normally producing sound on the Dragon hangs up the processor for the duration of the sound Premier's sound card will have its own processor A version of the Logo language is also planned for release in September

The next big step for Premier as far as the Dragon is concerned comes when Dragon Data launches the Dragon 64

Says Peter "The advantage of the 64 is that it is a soft machine — by that I mean that it only comes into its own with a disc operating system to load a language or other software "Loading a 64K file from cassette is no fun

"In a sense says John the Delta disc system is a lowish-level system because it operates through an extension of the existing Basic language on the Dragon The next step up is a stand alone operating system

Rolls in a Mini

Unlike Z80-based machines where the CP/M operating system has become a standard there is no direct equivalent for the 6809 which the Dragon uses

There are two contenders — Flex and OS9 Dragon Data intends to put OS9 on to the 64 machine Premier has chosen Flex Explains John, 'OS9 hasn t been going as long as Flex and was designed to be a multi tasking system

' We think Flex is better because there is more software available under the system and because we think OS9 may turn out to be a little too sophisticated for the Dragon

' OS9 on the Dragon is a little like putting a Rolls-Royce engine in a Mini — it is difficult to see how Dragon Data will make use of OS9 s multi tasking capabilities They seem more suited to Dragon s planned business machine based on the 68008 chip

Premier has its own thoughts The company will support the Flex operating system on the 64K Dragon using either its single or double-density Delta disc units

With Flex everything in the Dragon — its Basic — goes out of the window explains Peter 'Instead the Flex operating system sits above 48K giving you 48K of work-space "It will give the Dragon owner access to an enormous range of standard languages and software

' We are currently in negotiation with Technical Systems Consultants in the US to licence our implementation of Flex

We think there is still some mileage in the Dragon yet That is not to say we aren t looking around for another machine to support which will sell in Dragon-like quantities We haven t found it yet though — neither the Lynx nor the Oric appeals

"We are also interested in writing system software for other people possibly for incorporation in new machines — simply because that is the type of work which we have found most rewarding ■

How does it compare?

***Keith and Steven Brain** see how the Acorn Electron measures up to the BBC micro*

At last Acorn's long-promised Electron has arrived on the scene But what facilities does it provide and how does it compare with the competition now that the whole standard of micros has improved dramatically while prices are dropping through the floor?

Perhaps it is rather unfair to compare the Electron with the BBC Model B, at twice the price, but as everyone has anticipated that it will have much in common with the BBC machine, it is inevitable that we must consider how close it is what features have been trimmed off in the interests of economy and how well it can stand up in its own right Although the following observations are based on an examination of a late prototype model, it seems unlikely that there will be any major revisions to the design at this late stage

To start with the Electron very sensibly uses a real full-depression typewriter-style keyboard and an external power supply These dictate that the shape and size of the package is very similar to that of many other recent micros such as the Commodore 64 and the Lynx The keyboard is of the standard *Qwerty* type with 55 keys including a full-sized space-bar but many of these keys are multi-function

In addition to the usual *Shift* and *Ctrl* keys a *Func* key is also provided In a major departure from previous Acorn practice this can be used in conjunction with 29 of the keys to enter whole Basic keywords These Basic keywords are clearly marked on the front edge of the key-caps so that the use does not suffer from the 'treble-vision syndrome associated with the closely packed legends of the Spectrum

A nice touch is that you are not forced to enter the keywords in this way If you are used to the BBC machine as the equivalent command abbreviations are also accepted Although the extra line of red function keys provided on the BBC are not included their action can be reproduced by using the *Func* key in combination with the number key 0 to 9

The transformer has been kept separate and is built into the mains plug This neatly avoids overheating problems but unfortunately it makes the whole plug unit large and unwieldy — we feel a separate box would have been more sensible

The power cable enters on the right-hand side of the machine, while on the left hand side are the sockets for cassette UHF to TV, RGB monitor and black and white monitor You will find that these are labelled clearly but only if you turn the machine upside down!

At the back of the case the bus lines are brought out to an edge connector for expansion purposes This connector projects from a recess at the back of the Electron and looks rather vulnerable, although we understand that it will be adequately covered in production versions A large bolt-hole at each end promises secure anchorage points for add-ons, but very serious omissions from the specification of the Electron are printer and joystick interfaces

Inside the case are two circuit boards On the right hand side is the switched mode power supply which is separated from the main board by a plastic divider The main board has a 6502A CPU running at 2MHz a 16K Rom containing the Basic, a 16K Eprom containing the operating system and four 64K × 1 bit Ram chips (giving a total of 32K) but the most interesting feature is a huge 68 lead ULA on the right which has taken over the functions of several of the chips in the BBC Of particular significance is the fact that it has replaced the standard 6845 video controller and internal timers, so that a number of operations possible on the BBC cannot be carried out on the Electron

The Electron uses the BBC dialect of Basic which you tend to either love or hate according to your leanings towards 'structured languages or simplicity in use The designers have taken care to make the Electron as compatible as possible with the BBC and the memory maps are identical Of the 32K of Ram 3 25K is used by the operating system and 0 25K reserved for machine code routines, leaving 28 5K available for programs graphics and data

Steven Brain



Keith Brain

Seven modes are available modes 3 and 6 are two colour text only (80 and 40 characters by 25 lines), mode 4 gives two colours with a resolution of 320 × 256, mode 5 gives four colours with a resolution of 160 × 256 mode 2 gives 15 colours with a resolution of 160 × 256 mode 1 gives four colours with a resolution of 320 × 256 and mode 0 two colours with a resolution of 640 × 256 Of the modes available on the BBC only the teletext mode (7) is not implemented

A major quirk of the Electron is the way Ram is organised In the interests of economy, four 634K × 1 bit Ram chips have been used but as these can only be read four bits at a time memory access time is virtually doubled so that the Electron is dramatically slower than the BBC Talking of speed in the context of micros can easily become rather like discussing top speeds of exotic cars when there is a 70mph speed limit However In this case, we believe that we are not talking about exceeding reasonable speed limits, but rather about almost doubling the time taken to perform routine tasks

Incorporation of the video driver routine into the ULA has further slowed down execution of graphics, so that although many games designed for the BBC will run on the Electron they proceed at less than half the speed with very significant effects on their appeal Although the personal micro-world is intensely price sensitive perhaps this is an unfortunate case of spoiling the ship for a ha porth of tar

The Electron will only produce one sound channel at a time, even though it accepts the channel parameter to make its software compatible with the BBC The same principles apply to the cassette interface, where you can only *Load* and *Save* at 1200 baud and even though the system accepts the **Tape 3* command, it continues to work at 1200 baud The *Envelope* command is retained, but is more limited in scope than that on the BBC No provision is made for sideways Roms, although the Basic chip could be replaced should you want a dedicated word-processor for example

We ultimately found ourselves rather uncertain as to which segment of the market Acorn are aiming for with the Electron The most obvious area seems to be education, where the high specification and price-tag of the Model B seem rarely justified by their actual practical applications in schools It is possible that this alternative machine will generate internal competition with the Model B rather than increased sales although we certainly welcome any approach which provides more children with increased 'hands-on' micro experience rather than limited demonstrations

The technical elegence of the Basic and operating system of the Electron may appeal to the serious home user but they will soon find themselves in need of add-ons most urgent of which is a printer interface Indeed it seems rather strange that any micro manufacturer should feel at this stage that a printer will be an unusual option Although Sir Computers of Cardiff will provide Electron add-ons including a printer interface and A/D converter (*PCW* 19-24 August) the user may soon find that his Electron needs to look like a 'souped-up ZX81 festooned with 'bolt-on goodies to meet his needs and that he would have been better off buying a Model B in the first place

For the third large group of users, who just like to play games on their machines the limited sound and graphics capabilities of the Electron seem poor value against the current competition Although extensive use of the Electron in schools will probably influence parents we feel that discerning children may well rebel against what may seem at first sight the obvious choice for a home computer ■



MY NAME IS DIAMOND, DAN DIAMOND I'M A PRIVATE COP. I WORK THE BIG APPLE A SEETHING METROPOLIS FILLED WITH HUMAN MISERY AND CHINESE TAKEAWAYS
NORMALLY I ONLY DO ROUTINE DIVORCE CASES BUT WHEN SHE WALKED INTO MY OFFICE I FOUND MYSELF INOLVED IN A CASE SO STRANGE THAT IT MADE THE BIG SLEEP LOOK LIKE A CAT NAP..
Salamander
SOFTWARE
PRIVATE DETECTIVE DISAPPEARS
Police are baffled by the disappearance of Dan Diamond. He was last seen approaching the eerie edifice known as Franklin's Tomb, but the authorities are completely unable to find any trace of him. Citizens are asked to report any information relating to his disappearance immediately. For further details buy FRANKLINS TOMB a new adventure game for the DRAGON 32 and 48K ORIC 1. This adventure comes complete with a 24-page illustrated Case File £9.95 from BOOTS SPECTRUM COMPUTERS FOR ALL WEB
BANANA DICTATOR
2 DEAD IN EVEREST TRAGEDY
The Everest Exped ended in tragedy terday as Carl and plunged down a to a grisly death the expedition was quoted
COLD WAR XARG ESCA
Thousands dead in Ice Storm
HUNT WINS GRAND PRIX
At yesterday's Monaco Grand Prix, a hunting party strayed onto the track at the climax of the race. Cars were halted as the hounds rampaged around the circuit. 'The whole place has gone to the dogs,' one driver was reported as saying. The race was restarted, riders and drivers battled bitterly around the course before the Hunt thundered past the finishing line to take the chequered flag (it hasn't been seen since)
PLAYER WINS OPEN
Eagle eyed spectators were privileged to
NEWS

In the firing line

Peter Bartley explains how to fire missiles in the second of a six-part series for the Vic20

Last week we saw how to create a randomly moving object on screen. This is pretty useless unless we can do something with it ourselves. How about creating our own 'blob'?

To move our object around, we must input information via the keyboard. There are two ways of doing this using *Get* and *Peek (197)*. Try the program in Figure 1.

This program demonstrates both *Peek* and *Get*. Line 10 checks if a key has been pressed — if not, it continues to check, otherwise it reads the *Peek* value of the key (line 30). The information is then printed. Try various keys.

> VICTRICK No 2 Normally only the cursor keys and SPACE repeat on the Vic. By Peking 650,255 all the keys can be made to repeat. Any number less than 63 restores the keys to their normal states.

So the two programs in Figure 2 are equivalent.

You may see that *Peek (197)* has the edge for speed of response and execution, so for the moment we'll stick with that. Coupled with last week's ideas, we can now start to write our program (Figure 3).

The only new things in the program are lines 70 and 80, which simply set limits on the screen position of your ship. Line 120 stops the "blob" going off the screen.

This is still no good until we can fire missiles. The problem here is how to allow your ship, the "blob", and the missile all to move at the same time. Add the following lines:

```
65 IF C = 30 THEN G = B − 22
133 IF G>0 THEN POKE G,86:POKE G + 30720,5
135 IF G<7680 THEN G = 0:GOTO 30
137 POKE G,32:POKE G + 30720,1:G = G − 22
```

Line 65 sets the starting position of the missile above your base if the "/" key has been pressed. Lines 133 to 137 check to see if a missile should be in flight and, if so, move and colour it. To colour the base, type

```
15 FOR A = 38664 TO 38905:POKE A,4:NEXT
```

All we have done is colour the bottom line of the screen!

As yet, our missile does not do anything if it hits the "blob". The way to overcome this is to *Peek* the space in front of it each time it is moved (remember the screen is memory-mapped, that is, each 'square' on the grid is a memory location and can have objects — or rather, their screen codes — *Poked* into it or *Peeked* from it). So put

```
136 IF PEEK (G − 22) = 81 THEN POKE 36876,
    200:POKE G,32:POKE G − 22,42:POKE 36876,
    0:G = 0
```

Don't forget to add *Poke 36878, 15* to line 10! So now the computer acknowledges a hit (though that's about all!). Let's improve the graphics a bit. How about

```
105 IF F = 2 OR F = 4 THEN H = 73:I = 86:GOTO
    110
107 H = 75:I = 74
110 POKE A,32:POKE A + 1,32:POKE A − 1,32:A =
    A + D(F)
130 POKE A,81:POKE A + 1,H:POKE A − 1,I
```

A little better perhaps? Lines 105 and 107 decide whether the wings of the bird will be up or down, depending on the random number, *F*.

> VICTRICK No 3 The screen can be regarded as a "window" which can be moved around. The memory locations containing the position of the window are 36865 (38) and 36864 (12). The figures in brackets indicate the normal values here. Try Poking various numbers into them. As well as this, the width and height of the window are determined by the values in 36865 (150) and 36867 (174). Experiment! You may come up with some interesting effects.

So, there's a start to a game. Most arcade games on the Vic will use these concepts (ie, use of keyboard *Peeks* for inputs, screen *Peeks* to check movements on the screen, etc). I'll leave it to you to devise a method of scoring (preferably with more points the higher the bird is), sound effects for the missiles, and a more impressive routine for when there is a hit (a word of advice: change line 136 to *136 If Peek (G − 22) = 81 Then X = 0:Gosub 500* and start a subroutine here, then you've got yards of space to work in — don't forget to make *Return* your last line). What we're looking for are good sound effects and graphics display.

I hope I've suitably shown you the 'bare bones' of this type of game. Do try and improve on the ideas here; necessarily they are a little brief. Next week, although the Vic graphics are fairly good, I'll be showing you how to vastly improve them. See you then! ■

Figure 1

```
10 PRINT "[CLR SCN] HIT A KEY!"
20 GET A$:IF A$ = "" THEN 20
30 A = PEEK (197)
40 PRINT "[CLR] THE PEEK (197)
   VALUE OF" A$ "=" A
50 GOTO 20
```

Figure 2

```
10 B = 7933
20 A = PEEK (197):IF A = 64 THEN 20
30 POKE B,32
40 IF A = 33 THEN B = B − 1
50 IF A = 26 THEN B = B + 1
60 POKE B,160:GOTO 20

10 B = 7933:POKE 650,255
20 GET A$:IF A$ = "" THEN 20
30 POKE B,32
40 IF A$ = "Z" THEN B = B − 1
50 IF A$ = "X" THEN B = B + 1
60 POKE B,160:GOTO 20
```

Figure 3

```
10 POKE 36879,8:PRINT "[CLR SCN]":
   D(1) = 22:D(2) = −22:D(3) = 1:D(4) =
   −1
20 A = 7933:B = 8174
30 C = PEEK (197):IF C = 64 THEN 100
40 POKE B,32
50 IF C = 33 THEN B = B − 1
60 IF C = 26 THEN B = B + 1
70 IF B<8164 THEN B = 8164
80 IF B>8185 THEN B = 8185
90 POKE B,160
100 F = INT (RND(1)*4) + 1
110 POKE A,32:A = A + D(F)
120 IF A<7680 OR A>8163 THEN A = A
    − D(F)
130 POKE A,81
140 GOTO 30
```

Set to music

Graham Hoare presents a simple music tutor program for the 16K Spectrum

This program, for a 16K Spectrum, allows you to construct a line of music which is then written on the screen and played at the same time. This line of music can then be saved for future use. The music is saved in three parts so remember to press the keys when prompted in the program.

When you enter the notes be careful to enter them correctly (from *A* to *G1*), otherwise some peculiar effects will be seen. A correction routine is not used as this would use up too much room and slow down the program.

The main parts of the program are as follows:

10 — Screen Colours
14-15 — Variables
100-180 — Print notes subroutine
200-290 — Main note calculations
1000-1200 — Print stave
2000-2200 — Write music
3000-3054 — Learn music
4000-4020 — Games routines
6000-9100 — Menu
9980-9991 — Data for note graphics

■

```
THE LISTING
  10 POKE 23658,8: BORDER 1: PAP
ER 5: INK 0: CLS : GO SUB 9990
  11 REM [illegible]
  14 LET go=0: LET pr=9: LET s=0
: DIM a$(2,1): DIM b$(2,1): DIM
d(30): DIM o$(30): DIM t(1)
  15 LET a$(1)="": LET a$(2)=""
: LET b$(1)="": LET b$(2)=""
  20 GO TO 6000
  99 REM [illegible]
 100 PRINT OVER 1;AT pr,s;"": R
ETURN
 105 PRINT OVER 1;AT pr,s;"": R
ETURN
 110 PRINT OVER 1;AT pr,s;a$(1);
AT pr+1,s;a$(2): RETURN
 115 PRINT OVER 1;AT pr,s;b$(1);
AT pr+1,s;b$(2): RETURN
 150 PLOT (s*8)+7,((22*8)-(pr*8)
)-8: DRAW 0,16: RETURN
 160 PLOT (s*8)+1,((22*8)-(pr*8)
-8: DRAW 0,-16: RETURN
 199 REM [illegible]
 200 LET s=s+1
 205 LET no=CODE n$(1)-67: LET p
r=no+2
 210 LET no=no*2
 215 IF n$(1)>"E" AND n$(1)<"F"
THEN GO TO 220
 220 LET no=no-1
 225 IF n$(1)="A" OR n$(1)="B" T
HEN LET no=no+2
 235 IF n$(2)="1" THEN LET no=no
+12: LET pr=pr+7
 240 IF n$(2)="F" OR n$(3)="F" T
HEN LET no=no-1
 245 IF n$(2)="S" OR n$(3)="S" T
HEN LET no=no+1
 250 LET pr=(20-pr)/2
 260 IF pr=INT pr THEN GO SUB (1
10+go)
 270 IF NOT pr=INT pr THEN GO SU
B (100+go)
 274 IF n>=1 THEN GO TO 280
 275 IF no<10 THEN GO SUB 150
 277 IF no>9 THEN GO SUB 160
 278 IF n=.025 AND no<10 THEN DR
AW 3,-3
 279 IF n=.025 AND no>9 THEN DRA
W -3,3
 280 BEEP n,no
 290 RETURN
 999 REM [illegible]
1000 FOR a=106 TO 138 STEP 8: PL
OT 0,a: DRAW 255,0: NEXT a
1010 PLOT 0,111: DRAW -8,0,-PI:
DRAW 6,24,.78: DRAW -2,0,PI: DRA
W 0,-32: DRAW -3,0,-PI
1200 RETURN
1999 REM [illegible]
2000 LET g=0: DIM d(30): DIM o$(
30): GO SUB 1000
2010 PRINT AT 0,0;"You can now wr
ite your own music using quavers
 (Q),crochets (C), minims (M) an
d semibreves (S).";AT 10,0;" Y
ou then type in the pitch of the
 note ie,C1=note C one octave abov
e middle C"
2015 PRINT "You may have a sharp
 or flat using S or F respect
ively after the note eg."C1F"."
2020 INPUT "No. of notes in tune
 (up to 30)";t(1): IF t(1)>30 T
HEN GO TO 2020
2100 FOR s=1 TO t(1)
2110 INPUT "Length,note";l$,n$:
IF n$="" OR l$="" THEN GO TO 211
0
2111 IF l$="Q" THEN LET d(s)=.02
5: LET go=0: GO TO 2119
2112 IF l$="C" THEN LET d(s)=.25
: LET go=0: GO TO 2119
2113 IF l$="M" THEN LET d(s)=.75
: LET go=5: GO TO 2119
2114 IF l$="S" THEN LET d(s)=2:
LET go=5: GO TO 2119
2118 GO TO 2110
2119 LET n$=n$+"  "
2120 LET o$((s*3)-1)=n$(1): LET
o$((s*3)-2)=n$(2): LET o$(s*3)=n
$(3): LET n=d(s)
2125 GO SUB 200
2128 NEXT s
2130 LET g=1: CLS : GO SUB 1000
2135 FOR s=1 TO t(1)
3900 PRINT AT 21,3; FLASH 1;"Pre
ss any key to continue"
3905 LET s=0: RESTORE
3910 IF INKEY$="" THEN GO TO 391
0
3920 IF INKEY$<>"" THEN GO TO 39
20
3930 RETURN
3950 FOR k=4 TO 21: PRINT AT k,0
;"": NEXT k: GO SUB 1020: RETURN
4000 PRINT "The beep command m
ay be said to be limited but so
me good effects can be obtai
ned"
4005 PAUSE 120: PRINT '' "For e
xample -"
4010 FOR k=-30 TO 40: BEEP .007,
k: BEEP .007,30-k: NEXT k
4015 PRINT '' "Is obtained by t
he short routine -"
4016 PRINT "FOR k=-30 TO 40: BE
EP .007,k: BEEP .007,30-k: NEXT
k"
4017 GO SUB 3900
4018 CLS : PRINT AT 0,0;"Anoth
er idea is putting two beep st
atements together eg. PAUSE 30"
4020 FOR k=1 TO 20: PAUSE 5: BEE
P .007,5: BEEP .007,30: NEXT k
4022 PRINT "FOR k=1 TO 20: PA
USE 5: BEEP .007,5: BEEP .007,30:
 NEXT k"
4024 PRINT "This produces a
kind of Munch sound .The two bee
ps can be taken out of the F
or-Next loop and used in a prog
ram"
4026 PRINT '' "Try experimentin
g with the beep statement ,if ap
propriate use For-Next loops."
4028 GO SUB 3900
4030 GO TO 6000
5999 STOP
6000 CLS : PRINT AT 0,11;"MUSIC"
6005 PRINT AT 1,11;"
6010 PRINT AT 4,6;"1 LEARN MUSIC"
6015 PRINT AT 6,6;"2 WRITE MUSIC"
6020 PRINT AT 8,6;"3 MUSIC FOR G
AMES"
6025 PRINT AT 10,6;"4 SAVE MUSIC"
6030 PRINT AT 12,6;"5 LOAD MUSIC"
6035 PRINT AT 14,6;"6 QUIT PROGR
AM"
6040 PRINT AT 17,7;"INPUT NO.(1-
6)"
6045 LET I$=INKEY$
6050 IF I$="1" THEN CLS : GO TO
3000
6055 IF I$="2" THEN CLS : GO TO
2000
6060 IF I$="3" THEN CLS : GO TO
4000
6065 IF I$="4" THEN SAVE "MU" DA
TA d(): SAVE "MU2" DATA o$(): SA
VE "MU3" DATA t(): GO TO 6000
6070 IF I$="5" THEN INK 5: LOAD
"MU" DATA d(): LOAD "MU2" DATA o
$(): LOAD "MU3" DATA t(): INK 0:
 GO TO 2130
6075 IF I$="6" THEN INPUT ""Y" T
O NEW";u$: IF u$="Y" THEN NEW
9100 GO TO 6040
9979 REM [illegible]
9980 DATA "C","D","E","F","G","A
1","B1","C1"
9981 DATA "S"
9989 STOP
9990 RESTORE 9990: FOR z=1 TO 8:
 READ z$: FOR x=0 TO 7: READ c:
POKE USR z$+x,c: NEXT x: NEXT z:
 RESTORE : RETURN
9991 DATA "a",0,30,60,120,124,56
,0,0,"b",0,30,34,66,68,56,0,0,"c
",6,6,6,6,6,6,30,56,0,"d",124,56,0
,0,0,0,0,0,"e",0,0,6,0,0,30,34,0
,"f",56,56,0,0,0,0,0,0
2141 LET n$=o$((s*3)-1)+o$((s*3-
2))+o$(s*3): LET n=d(s): IF n>.
4 THEN LET go=5: GO TO 2143
2142 LET go=0
2143 GO SUB 200
2148 NEXT s
2200 INPUT "To play again input
Y";u$: IF u$="Y" THEN GO TO 213
0
```

```
3210 GO TO 6000
2999 REM [redacted]
3000 RESTORE : LET re=0 : LET n=.
25 : LET sp=0 : LET g=0 : GO SUB 10
0
3001 GO SUB 3005 : GO TO 3036
3005 READ n$ : LET n$=n$+
3010 IF n$(1)= " " THEN RETURN
3015 PRINT AT 11,g+2 n$
3017 LET g=g+1
3020 GO SUB 200
3030 IF re=1 THEN RETURN
3031 GO TO 3005
3035 PRINT AT 1,1, This is the sc
ale of C Major. The first note
is C and the last is C1  8 notes
after the fist.
3036 PRINT AT 13,3,'A "Scale" is
a group of noteswhich are arrang
ed in a special  order so to mak
e,in simple terms,a major or min
or sequence.
3037 GO SUB 3900
3038 CLS : PRINT AT 0,0, The len
gth of note depends on the leng'
h one gives it
3039 PRINT AT 3,3 ie. -' AT 4 0
 Semibreve=o=  1 sec. BEEP leng
th  Minim  =o=0.5 sec. BEEP
length  PLOT 87,134 : DRAW 0,19
3040 PRINT AT 8,0 Crochet =●=.
25 sec. BEEP length  PLOT 87,10
0  DRAW 0,12  PRINT AT 10 0, Qua
ver  =●=.125sec. BEEP length
PLOT 87,92  DRAW 0,12  DRAW 3,-3
3041 PRINT AT 14,0, When you try
 and write your   own music thes
e will be       abreviated to
"S","M","C"and"Q" respectively.
3042 GO SUB 3900
3043 CLS : PRINT AT 0,2, This ro
utine shows the         differenc
e between different   lengths o
f notes.
3044 RESTORE : GO SUB 1000 : LET
s=0
3045 LET n=.025 : GO SUB 3000 : PR
INT AT 14,8, Quavers
3046 GO SUB 3900
3047 GO SUB 3950
3048 LET n=.25 : GO SUB 3000 : PRI
NT AT 14,8, Crochets  GO SUB 39
00
3049 GO SUB 3950
3050 LET sc=6 : LET n=.5: GO SUB
3000 : PRINT AT 14,8, Minims  GO
SUB 3900
3051 GO SUB 3950
3052 LET sc=6 : LET n=1 : GO SUB 3
000 : PRINT AT 14,8, Semibreves
 GO SUB 3900
3053 CLS
3054 GO TO 6000
3099 STOP
```

```
           MUSIC
      1 LEARN MUSIC
      2 WRITE MUSIC
      3 MUSIC FOR GAMES
      4 SAVE MUSIC
      5 LOAD MUSIC
      6 QUIT PROGRAM
       INPUT NO.(1-6)
```

```
This is the scale of C Major.
The first note is C and the last
is C1  8 notes after the fist.

 C D E F G A1B1C1
  A "Scale" is a group of notes
which are arranged in a special
order so to make,in simple terms
 a major or minor sequence.

  Press any key to continue
 The length of note depends on
the length one gives it
    ie. -
Semibreve=o=  1 sec. BEEP length
Minim     =o=0.5 sec. BEEP length
Crochet   =●=.25 sec. BEEP length
Quaver    =●=.125sec. BEEP length
 When you try and write your
own music these will be
abreviated to "S","M","C"and"Q"
respectively.

  Press any key to continue
 This routine shows the
difference between different
lengths of notes.

 C D E F G A1B1C1
      Quavers
```

A fundamental constant

***Boris Allan** presents a program to calculate the value of e*

The exponential *e* the base of natural logarithms is a fundamental constant in mathematics *e* appears in many guises, especially in calculus, and has a very simple definition:

$e = 1 + 1/1! + 1/2! + 1/3! + 1/4! + 1/5! +$

and onwards In English this means that *e* is the sum of 1 plus the reciprocal of the factorial of 1, plus the reciprocal of the factorial of 2, plus the reciprocal of the factorial of 3, and so forth The factorial of, say, 4 is 4 × 3 × 2 × 2 × 1 and so it is simple to realise that 4! = 4 × 3!

Rewriting the expansion for *e*, we can produce

$e = 1 + t(1) + t(2) + t(3) + t(4) + t(5) +$

where in general, $t(n) = t(n-1)/n$ — think about it To produce a value for *e* by a simple Basic program is not too difficult

```
1000 M=0 T=1 E=0
1010 REPEAT
1020 M=M+1 T=T/M E=E+T
1030 UNTIL T=0
```

and this will produce a value correct to about 7 decimal places — hardly an earth-shattering calculation, but then hardly earth shattering accuracy either I want to rule the digits

Suppose I asked you to calculate the value of e correct to a small number of decimal places say 20? Suppose that I was cruel (am cruel) and you had to work it out by hand (assume that you can still remember how to add, subtract, divide and multiply)? First, you would calculate term 1, ie *t(1)*, to 20 decimal places — actually the answer is 1 Second, you would take the result of *t(1)*, and divide that by 2, to obtain *t(2)* — answer 5 *t(3)* is 5 divided by 3, and does not finish exactly — 1 followed by an infinite number of 6s

There are various ways in which it is possible to cope with these never-ending 6s including forget about it just have a 1 and then nineteen 6s round the last 6 up to give a 7 or perform the calculation to a greater number of digits and forget about rounding until the very end (the end comes when all the digits of the term are zero) I propose to use the third variant, because it is simpler and is more accurate than rounding at the end of each term's 20 digits

So we have worked out how to perform the operation take each succeeding term divide it by the correct factor and then add the result to the cumulating total All we have to do is to work out how to divide long numbers (lots of little divisions) and then how to add all the terms together (and round the result)

The most important part of the program is that between lines 10 and 100 and in line 110 the formatter (@%) is set to produce 1 digit wide output (for the output at lines 300 to 330) At 120 the number of digits (*N%*) is input and 4 added to that number — the extra digits accuracy *Term%*(*N%*) is the array I use to store the *N%* digits of the successive terms and *E%*(*N%*) is the array used to store the cumulated total (remember *N%* is now 4 more than the number of digits needed in the result)

Line 140 initialises the zero elements of *Term%* and *E%* to 1 the zero element is the whole number and elements 1 to *N%* are the *N%* decimal places, the initial value of *e* (before any term) is 1 and the first term is also 1 *M%* (the term number)

```
10REM---------------------------
20
40REM  CALCULATION OF THE CONSTANT e
50
60
70REM  (c) BORIS ALLAN, 1983
90
100REM---------------------------
110 @%=1 : REM SETS FORMAT
120 INPUT N% : N%=N%+4
130 DIM TERM%(N%),E%(N%)
140 TERM%(0)=1 :E%(0)=1
150 M%=1
160
170 REPEAT SUM%=0 : REM BUILDS UP TERMS
180 FOR I%=0 TO N%
190 IF TERM%(I%)<>0 THEN PROC_DIVISION
200 NEXT I%
210 M%=M%+1
220 UNTIL SUM%=0 : REM ALL TERMS ARE ZERO
230
240 FOR I%=N% TO 1 STEP -1 : REM ISOLATES ENTRIES
250 IF I%=N%-4 THEN E%(I%)=E%(I%)+E%(I%+1) DIV 5 : REM ROUNDING
260 FOR J%=3 TO 1 STEP -1
270 IF I%>=J% THEN PROC_SPLITTING
280 NEXT J% : NEXT I%
290
300 N%=N%-4 : REM READY TO PRINT OUT RESULT
305 VDU 2
310 PRINT E%(0);" ";
320 FOR I%=1 TO N% : PRINT E%(I%); : NEXT I% : PRINT
325 VDU 3
330 END : REM OF MAIN PROGRAM
340
350 DEF PROC_DIVISION : REM DIVIDING BY M%
360 IT%=TERM%(I%) DIV M%
370 IF I%<>N% THEN PROC_TERMS
380 ENDPROC : REM _DIVISION
390
400 DEF PROC_TERMS : REM ADDING TERMS
410 TERM%(I%+1) = TERM%(I%+1) + 10*(TERM%(I%)-M%*IT%
420 TERM%(I%) = IT%
430 E%(I%) = E%(I%)+IT%
440 SUM%=SUM%+IT%
450 ENDPROC : REM _TERMS
460
470 DEF PROC_SPLITTING : REM DISTRIBUTING TERMS
480 SUM%=1 : FOR K%=1 TO J% : SUM% = SUM%*10 : NEXT K%
490 IT%=E%(I%) DIV SUM%
500 E%(I%-J%)=E%(I%-J%) + IT%
510 E%(I%)=E%(I%) - SUM%*IT%
520 ENDPROC : REM _SPLITTING
```

starts at 1 — lthe 150

From 170 to 220 a short routine is repeated until a variable *Sum%* is zero the first thing to happen is that *Sum%* is set to zero For each element/digit from 0 to *N%* (line 160) a check is made to see if that element of the *Term%* array is zero if not *Proc_division* is called

The routine at 350 to 380 is made into a *Proc*, and not incorporated into the main program, because it clarifies the conditional statement at line 190 (and obviates the need for a *Goto*) At line 360 the existing value stored in the *I%*th element of *Term%* is integer divided by *M%* (the number of the term in the sequence) If the element is not the last in the array (ie *I%<>N%*) then a call is made to *Proc_terms* (again to save a *Goto*)

When one divides a number, the remainder of the division is carried on to the next digit in the sequence this is what occurs in lines 410 to 420 Line 430 is where the array *E%* is cumulated In line 440 *Sum%* is incremented and, if no arithmetic is performed (ie all zeros), *Sum%* ends up as zero After these calls control returns to line 200 where *M%* is incremented by 1 This continues until *Sum%*=0, stasis

The next segment (240 to 280) examines successive elements of *E%* from the least significant leftwards Lines 260 to 280 operate on three elements at a time based on the element *I%* by use of *Proc_splitting*

In line 460 *Sum%* takes the value 10, 100, or 1000 depending on the value of *J%* — this routine splits each value in an element steadily into digits (tens hundreds and thousands), to take into account the fact that a value stored in *E%(1%)* will probably be greater than 9 The number of elements is greater (by 4) than the number of digits accuracy and at line 250 the value stored in element *N%*−4 is rounded

The section from 300 to 330 prints out the value to the specified number of digits lines 305 and 325 switch the printer on and off — you know what to do if you have no printer

Here is a problem Improve this routine, and implement it for positive and negative values of *X* where the exponent of *X* is

exp(X) = 1 + X/1! + X^2/2! + X^3/3! +

First prize 1 copy of my BBC book from Sunshine Second prize 1 copy of my BBC book from Sunshine plus an autographed photograph ■

```
2.71828182845904523536028747135266249775724709369995957496696762772407663035354 7
59457138217852516642742746639193200305992181741359662904357290033429526059563073
81323286279434907632338298807531952510190115738341879307021540891499348841675092
44761460668082264800168477411853742345442437107539077744992069551702761838606261
33138458300075204493382656029760673711320070932870912744374704723069697720931014
16928368190255151086574637721112523897844250569536967707854499699679468644549059
87931636889230098793127736178215424999229576351482208269895193668033182528869398
49646510582093923982948879332036250944311730123819706841614039701983767932068328
23764648042953118023287825098194558153017567173613320698112509961818815930416903
51598888519345807273866738589422879228499892086805825749279610484198444363463244
96848756023362482704197862320900216099023530436994184914631409343173814364054625
31520961836908887070167683964243781405927145635490613031072085103837505101157477
041718986106873969655212671546889570350354
```


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Noughts and crosses

***C Moorhouse** explains how to print on the graphics screen and play noughts and crosses*

The only drawback to the Dragon 32 is its inability to print on the graphics screens. The elegant solution is described by David Lawrence in his book *The Working Dragon 32* (a must for every Dragon 32 owner).

However, for only a few characters, it is still easier to *Draw* them. Where one or two letters are to be used a number of times, the *Get/Put* commands mean that *Draw* has to be used only once per character. An advantage of *Put* is that it can draw over information already there. This enables grids to be identified by numbers inside each square.

An example of the saving in program space is shown in the accompanying program — *Noughts and Crosses*.

Program notes

Lines	
20-90	GET characters X and O into memory
110-340	Set up the playing board
350-560	Main loop
600-620	Set up another game
630-640	Finish game
1000-1080	Instructions

```
1 REM NOUGHTS AND CROSSES
2 REM LAST REVISED: 13/12/82
3 REM
4 REM WRITTEM FOR DRAOOR 32
5 REM BY CHRIS MOORHOUSE
6 REM
7 GOSUB 1000
9 DIM X(30,30):DIM O(30,30)
10 PMODE 2,1:SCREEN 1,1:PCLS
20 X$="NE15NF15NG15NH15"
30 O$="R30D30L30U30"
50 DRAW"C5BM75,30;XX$;"
60 DRAW"C5BM110,15;XO$;"
70 GET(60,15)-(90,45),X,G
80 GET(110,15)-(140,45),O,G
90 PCLS
110 LINE(100,5)-(100,155),PSET
120 LINE(150,5)-(150,155),PSET
130 LINE(50,55)-(200,55),PSET
140 LINE(50,105)-(200,105),PSET
150 DRAW"C5BM75,27D6"
160 DRAW"C5BM123,27R5D3L5D3R5"
170 DRAW"C5BM173,27R5D3NL5D3L5"
180 DRAW"C5BM73,77D3R5NU3D3"
190 DRAW"C5BM127,77L5D3R5D3L5"
200 DRAW"C5BM177,77L5D6R5U3L5"
210 DRAW"C5BM73,127R5D6"
220 DRAW"C5BM123,127R5D3NL5D3L5U6"
230 DRAW"C5BM173,132R5U6L5D3R5"
240 DRAW"C5BM29,180U10F10U10"
250 DRAW"C5BM53,170L10D5NR10D5R10"
260 DRAW"C5BM61,175NF5NE5NG5NH5"
270 DRAW"C5BM68,170R5ND10R5"
280 DRAW"C5BM90,170R10D5L10NU5D5"
290 DRAW"C5BM104,170D10R10"
300 DRAW"C5BM118,180U10R10D5NL10D5"
310 DRAW"C5BM132,170F5NE5D5"
320 DRAW"C5BM156,170L10D5NR10D5R10"
330 DRAW"C5BM160,180U10R10D5L8NL2F6"
340 DRAW"C5BM175,175R10"
350 PUT(200,158)-(230,188),X,PSET
360 GOTO 400
370 PUT(200,158)-(230,188),O,PSET
380 GOTO 400
400 P=PPOINT(215,173)
410 A$=INKEY$:IF A$="" THEN 410
420 A=VAL(A$)
430 ON A GOTO 450,460,470,480,
    490,500,510,520,530
440 IF A=O THEN GOTO 600
450 H=60:V=15:GOTO 540
460 H=110:V=15:GOTO 540
470 H=160:V=15:GOTO 540
480 H=60:V=65:GOTO 540
490 H=110:V=65:GOTO 540
500 H=160:V=65:GOTO 540
510 H=60:V=115:GOTO 540
520 H=110:V=115:GOTO 540
530 H=160:V=115:GOTO 540
540 Q=PPOINT(H,V)
545 IF Q=5 THEN GOTO 410
550 IF P=0 THEN PUT(B,V)-(H+30,V+30),
    O,PSET: GOTO 350
560 IF P=5 THEN PUT(H,V)-(H+30,V+30),
    X,PSET: GOTO 370
600 CLS: PRINT@262,"ANOTHER GO(Y/N)?"
610 B$=INKEY$: IF B$="" THEN 610
620 IF B$="Y" THEN GOTO 10
630 PRINT@260,"THANK YOU FOR PLAYING"
640 PRINT@331,"GOOD-DAY": END
1000 CLS8: PRINT@261,"WELCOME TO THE
     GAME OF";
1010 PRINT@326,"NOUGHTS AND CROSSES";
1020 FOR N=1 to 2000: NEXT N: CLS3
1030 PRINT@65,"PLAYER 1 USES THE
     CROSSES (X)";
1040 PRINT@104,"AND HAS FIRST GO";
1050 PRINT@166,"PLAY THEN ALTERNATES";
1060 PRINT@264,"AFTER EACH GAME";
1070 PRINT@295,"PRESS ANY LETTER";
1080 FOR N=1 TO 5000: NEXT N: RETURN
```

Modules 10–14

Continuing our series on machine code master

Modifying the memory
Having learned how to examine the memory we now proceed to the next stage, which is altering its contents. In this section we present two more modules which will allow you to step through the memory, forwards or backwards displaying the contents of individual bytes and, if you wish, altering the contents of the byte currently displayed.

Module 1.10
On the basis of previous modules, you should have little difficulty in discerning that this module accepts a hex value in the range 0-FF (0-255), calls up a translation into decimal and returns that value to the next module, from which it is called.

Module 1.11
The purpose of this module is to allow the user to step through the memory from a chosen start address and to modify the contents of individual bytes. The major part of the module is concerned with outputting the values in each byte to the screen in a comprehensible format and to moving through the memory. Changes to memory contents are accomplished by the last line, including a call to the previous module.

Commentary
Having obtained the start address, the address of the current byte is printed out, together with the value which it contains.

Four prompts are used by the module: + means move on to the next byte, – means move back one byte and *E* quits the module. The remaining prompt is *I*, which calls up the previous module and allows a new value to be placed into the current byte.

Module 1.12
Should you wish to use the monitor to enter machine code programs directly into the memory in hexadecimal form, this one line routine will allow you to call up the machine code routine withing having to quit the program. It would be wise not to run any machine code program before ensuring that the program so far entered has been saved.

Saving and loading files
Now that you have the ability to enter new values into the memory and hence to develop a machine code program, you need to be able to save the programs that you will eventually develop and enter. You also need to be able to reclaim those programs from disc or tape, depending on where you wish to store them. The four short routines which follow are designed to make this possible.

Module 1.13
When saving a block of information on tape or disc — this is done in the form of a file — a named location must first be opened before information is sent to it and then closed when all the necessary information has been stored. When the information is recalled, the name of the file needs to be specified. This module allows the necessary file name to be input.

Module 1.14
The machine code programs which you will eventually develop with the aid of the programs in this book will be contained in blocks of memory. To save them, the program must be given two pieces of information, namely where the block starts and where it finishes. We already have a routine which obtains the start address, this one performs the same function for the finish address. ■

This is an extract from *Commodore 64 Machine Code Master* by David Lawrence and Mark England published by Sunshine Books

MODULE 1.10

```
13000 REM*********************************
13001 REM GET 1 BYTE
13002 REM*********************************
13007 H$ = ""
13010 INPUT "BYTE ( IN HEX ) : "; H$
13030 GOSUB 11950
13040 IF ERR OR H<0 OR H>255 THEN PRINT
"[CU]" : GOTO 13000
13050 RETURN
```

MODULE 1.11

```
13100 REM*********************************
13101 REM MEMORY MODIFY
13102 REM*********************************
13110 GOSUB 12050
13120 H = AD : GOSUB 11000 : PRINT H$ TA
B(6) "/  ; : O2$ = ""
13140 GOSUB 11100 : AD = AD-1 : PRINT H$
 SPC(6) ;
13150 T$ = ""
13160 INPUT " +,-,I,E : "; T$
13170 IF T$="+" AND AD<65535 THEN AD = A
D+1 : GOTO 13120
13180 IF T$="-" AND AD>0 THEN AD = AD-1
: GOTO 13120
13190 IF T$="E" THEN RETURN
13200 IF T$<>"I" THEN PRINT"[2*CU]" : GO
TO 13120
13210 GOSUB 13000 : POKE AD,H : GOTO 131
20
```

MODULE 1.12

```
13500 REM*********************************
13501 REM MACHINE CODE EXECUTE
13502 REM*********************************
13510 GOSUB 12050 : SYS AD : RETURN
```

MODULE 1.13

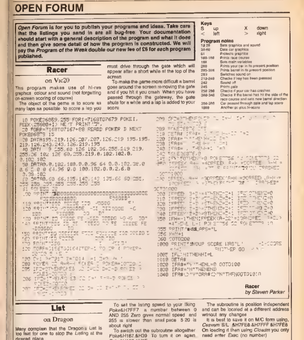
```
11250 REM*********************************
11251 REM INPUT FILE NAME
11252 GOSUB 25500 : IF DEV=4 THEN 11290
11255 IN$ = ""
11260 INPUT " FILE NAME : "; IN$ : T = L
EN(IN$)
11280 IF T>16 OR T<0 THEN PRINT "[CD]FIL
E NAME INVALID" : GOTO 11260
11290 RETURN
```

MODULE 1.14

```
11200 REM*********************************
11201 REM INPUT FINISH ADDRESS
11202 REM*********************************
11205 H$ = ""
11210 INPUT "FINISH ADDRESS ( IN HEX) :
"; H$ : GOSUB 11950
11230 IF ERR OR H<0 OR H>65535 THEN 1120
0
11240 EA = H : RETURN
```


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Racer

on Vic20

This program makes use of hi-res graphics colour and sound (not forgetting on-screen scoring of course)

The object of the game is to score as many laps as possible to score a lap you must drive through the gate which will appear after a short while at the top of the screen

To make the game more difficult a barrel goes around the screen removing the gate and if you hit it you crash When you have passed through the gateway, the gate shuts for a while and a lap is added to your score

Keys

S	up	X	down
<	left	>	right

Program notes

10 20	Sets graphics and sound
30-60	Data car graphics
61	Protects graphics
100-180	Prints race course
190	Sets main variables
200	Prints your car in its present position
205-208	Prints barrel in its present position
209	Switches sound on
210-240	Checks if key has been pressed
242	Sound off
245	Prints gate
250 290	Checks if your car has crashes
300-340	Checks if the barrel has hit the side of the race course and sets new barrel direction
350-360	Car passed through gate and lap score
1000	Another go plus hi-score

```
10 POKE36869,255 FORI=7168TO7679 POKEI,
PEEK(25600+I) NEXT PRINT"[illegible]",
20 FORP=7168TO7167+88 READD POKEP D NEXT
POKE36879 15
30 DATA195,219,126,207,207,126,219 195,195,
219,126,243,243,126,219,195
40 DATA[illegible] 255,60 126 102,36,255,219 219,
255,36 102 126 60,255,219,0,102,102,0,
0,102 102
50 DATA0,0,102,100,0,0,96 64 0,0,102,38,0
0,6 [illegible] 0 0 64,96 0,0 100,102,0,0,2,6,0
0,38 102
60 DATA0,60 66,135,140,140 135,66 60 255,
255 255 255,255 255,255 255
61 POKE52 28
100 PRINT"[illegible]DDDDDDDDDDDDDDDDDDDDDDDDDDE
     FDDDDDDDDDDD                  FDDDDD"
110 PRINT"DDD [illegible]
120 PRINT"DD [illegible]
130 PRINT"DD [illegible]
140 PRINT"DDD [illegible]
150 PRINT"DD [illegible]
160 PRINT"ID [illegible]
170 PRINT"DDG [illegible]
180 FORF=8166TO8164STEP-1 [illegible]
190 [illegible]
200 POKEA [illegible]
205 IFD=2THENPOKEB [illegible]
206 IFD=1THENPOKEB [illegible]
207 IFD=3THENPOKEB [illegible]
208 IFD=4THENPOKEB [illegible]
209 POKE36878 [illegible]
210 GETA$ IFA$= [illegible]
220 IFA$= [illegible]
230 IFA$= [illegible]
240 IFA$= [illegible]
242 POKE36876,0
245 [illegible]
250 IFPEEK(A+[illegible])=4ORPEEK(A+H)=5ORPEEK(A-H)=
    [illegible] YOU CRASHED
GOTO1000
290 IFPEEK(A+H)=3ORPEEK(A+H)=3ORPEEK(A+H)=
    1ORPEEK(A)=[illegible]THENPRINT"[illegible] CRASHED"
GOTO1000
300 IFPEEK(B+D)=4THENZ=Z+1 IF[illegible]THENZ=0
310 IFPEEK(B+D)=[illegible]THENZ=Z+1 IF[illegible]THENZ=0
320 IFPEEK(B+D)=6THENZ=Z+1 IFZ>[illegible]THENZ=0
330 IFPEEK(B+D)=7THENZ=Z+1 IF[illegible]THENZ=0
340 IFPEEK(B+D)=8THENZ=Z+1 IF[illegible]THENZ=0
350 IFH=-1THENIFPEEK(A-22)=10ANDPEEK[illegible]
    =4[illegible] L=L+1 POKE36876 [illegible] POKE[illegible] 10
355 PRINT"[illegible]LAPS="L
356 Y=Y+1
360 GOTO200
1000 PRINT"[illegible]YOUR SCORE WAS"L"[illegible]HI-SCORE
     ="HI"[illegible]ANOTHER GO[illegible]
1005 IFL>HITHENHI=L
1010 GETA$
1020 IFA$="Y"THENL=0 GOTO100
1030 IFA$="N"THENEND
1040 IFA$<>"Y"ORA$<>"N"THENGOTO1010
```

Racer
by Steven Parker

List

on Dragon

Many complain that the Dragon's List is too fast for one to stop the *Listing* at the desired place

Well here is a program for a short M/C subroutine with the use of which the *list* speed can be set at will It works by inserting a delay loop in the Dragon's printing routine

After entering the program, *Run* it and if you don't get an error message enter EXEC&H7FE8 and press *Enter*

If you list the program now you will see that the listing is done at a more moderate speed

To set the listing speed to your liking *Poke*&H7FF7 a number between 0 AND 255 Zero gives normal speed and 255 is slower than snail pace 5 20 is about right

To switch out the subroutine altogether *Poke*&H167 &H39 To turn it on again *Poke*&H167 &H7E

The subroutine is position independent and can be located at a different address without any changes

It is best to save it on M/C form using, *Csavem* S/L &H7FE8 &H7FFF &H7FE8 On loading it then using *Cloadm* you only need enter *Exec* (no number)

Program

```
10   DATA 30 8C 00 BF 01 55 86 7E B7
     01 67 39 34 10 8E 05 01 30 1F
     26 FC 35 10 26
20   CLEAR200 &H7FE7 A=0
30   FOR I &H7FE8 TO &H7FFF
40   READ A$ POKE I VAL( &H +A$)
45   A=A+VAL( &H +A$)
50   NEXT I
60   IF A<>1008 THEN PRINT DATA
     ERROR CHECK
```

List
by F Webber-Rookes

OPEN FORUM

Scribble

on ZX81

Scribble is word-processing with a difference. It is a game for thinkers and might even improve your word power. Be warned though — it can be addictive.

After the computer has printed out the board (line 2000) a letter will appear, with its value, at the bottom. Using the arrowed keys, you should move it on to one of the randomly-printed squares (lines 2025 to 2050) as part of a word. When the letter is in place, press P to park it, and press L to get another.

There are penalties for hitting another letter, and if you cannot use a letter then you can throw it into the bin and another will replace it. All the rules are contained within the program.

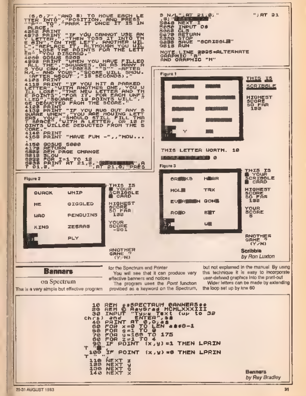
You are, of course, seeking the highest score possible, but you must weigh the chances of increasing your score by waiting for the right letter to appear, against the loss of points each time you win an unwanted letter. It is up to you to cut and run to reduce any losses by pressing S to finish the game before all the squares are filled or waiting for the right letters to appear to increase your score.

Figure 2 shows what can happen when you wait to finish all the words — a score of minus 581, whereas Figure 3 shows a score of just eight, after 10 points were deducted from the score for each unfilled square. Figure 1 shows a newly-drawn board.

The program makes use of *Peek* and *Poke* to work as fast as possible, and pressing S stops the game, scans the board, and prints the score (lines 3000 to 3240).

You must decide which words are eligible for the game, and for the correct spelling, so a good dictionary is clearly a useful add-on for your ZX81 for this game — unless you know how to put the whole of the Oxford Dictionary into the remains of your 16K memory.

```
  50 REM "SCRIBBLE"
  60 FAST
  70 LET HS=100
  80 DIM D(9)
  90 GOSUB 4000
 100 GOSUB 2000
1000 LET T=0
1005 LET U=0
1010 LET PA=(PEEK 16396+256*PEEK
 16397)+459
1030 LET SA=PA
1050 PRINT AT 21,14;"     ",AT 21
,14,T
1055 LET Q=INT (38+RND*26)
1062 LET W=INT (Q/6)
1065 PRINT AT 19,19,"  ";AT 19,1
9,W
1070 POKE PA,Q
1075 SLOW
1080 LET MPA=PA+(INKEY$="6")*33-
(INKEY$="7")*33+(INKEY$="8")-(IN
KEY$="5")
1090 LET SPA=MPA
1100 IF INKEY$="P" THEN GOTO 119
0
1110 IF INKEY$="S" THEN GOTO 300
0
1120 IF PEEK MPA=128 THEN GOTO 1
070
1130 IF PEEK MPA=136 OR PEEK MPA
=8 THEN POKE MPA,0
1140 IF PEEK MPA<>0 THEN GOTO 13
00
1150 IF PEEK MPA<>0 THEN LET T=T
-W
1155 IF PEEK MPA<>0 THEN GOTO 10
50
1160 POKE PA,0
1170 LET PA=MPA
1180 GOTO 1070
1190 REM PARK LTR AND RENEW
1192 LET T=T+W
1195 LET U=U+1
1200 LET F(U)=SPA
1210 LET R(U)=Q
1220 POKE SPA,Q
1230 LET PA=0
1240 FOR I=1 TO 4
1250 PRINT AT 17,0,"[redacted]",AT
17,0;"          ",AT 17,0,"PRESS L"
,AT 17,0,"          ",AT 17,0,"[redacted]"
1260 NEXT I
1270 LET O$=INKEY$
1275 IF O$<>"L" THEN GOTO 1270
1280 PRINT AT 18,0,"          "
1285 PRINT AT 19,19,"    "
1287 LET T=T+W
1290 GOTO 1070
1300 REM CHANGE IF IN COLLISION
1310 POKE PA,0
1320 LET PA=SA
1330 GOTO 1150
2000 REM PRINT BOARD
2005 FAST
2010 DIM F(250)
2015 DIM Q(250)
2018 PRINT AT 19,0,"THIS LETTER
WORTH  "
2020 PRINT AT 21,0,"[redacted] "
2025 LET V$="[redacted]"
2030 FOR I=1 TO 9
2035 LET D(I)=(INT (1+RND*7)+1)
2040 NEXT I
2050 PRINT AT 2,3;V$( TO D(1)),A
T 5,3,V$( TO D(2)),AT 8,3,V$( TO
 D(3)),AT 11,3,V$( TO D(4))
2060 PRINT AT 2,12,V$( TO D(5)),
AT 5,12,V$( TO D(6)),AT 8,12,V$(
 TO D(7)),AT 11,12,V$( TO D(8));
AT 14,12,V$( TO D(9))
2070 PRINT AT 0,0,"[redacted]"
2080 FOR I=1 TO 16
2090 PRINT "[redacted]";TAB 21,"[redacted]"
2100 NEXT I
2110 PRINT AT 16,0,"[redacted]"
2160 PRINT AT 13,1,"[redacted]",AT 14,1
,"[redacted]",AT 15,1,"[redacted]"
2170 PRINT AT 0,23,"THIS IS",AT
1,23,"[redacted]"
2180 PRINT AT 2,23;"SCRIBBLE",AT
3,23,"[redacted]"
2190 PRINT AT 5,23;"HIGHEST",AT
6,23,"SCORE",AT 7,23,"SO FAR."
2200 PRINT AT 8,24,HS
2210 RETURN
3000 REM SCORE REPORT
3010 FAST
3020 CLS
3030 GOSUB 2050
3040 FOR I=1 TO U
3050 POKE F(I),R(I)
3060 NEXT I
3070 LET L=0
3080 FOR I=PA-434 TO PA+47
3090 IF PEEK I=136 OR PEEK I=8 T
HEN LET L=L-10
3100 NEXT I
3110 SLOW
3120 PRINT AT 1,23,"[redacted] YOUR  ",AT
 3,23,"[redacted] CARD
3130 PRINT AT 10,23,"YOUR",AT 11
,23,"SCORE "
3140 LET T=T+L
3150 PRINT AT 12,24,T
3160 IF T>HS THEN PRINT AT 14,23
,"WELL DONE",AT 15,23,"[redacted]
",AT 16,23,"THE BEST",AT 17,23,"
YET....."
3170 IF T>HS THEN LET HS=T
3180 FOR I=1 TO 60
3190 NEXT I
3200 PRINT AT 19,23;"ANOTHER",AT
 20,23,"GAME ?",AT 21,23," (Y/N)
3210 IF INKEY$="" THEN GOTO 3210
3220 IF INKEY$<>"Y" THEN STOP
3230 CLS
3240 GOTO 100
4000 REM INSTRUCTIONS
4010 PRINT TAB 5,"WELCOME TO SCR
IBBLE",TAB 6,"[redacted]"
4020 PRINT
4030 PRINT "SCRIBBLE IS A WORD G
AME. TRY TO","FORM WORDS IN THE
PRINTED","SQUARES USING ALL THE
SQUARES","IF POSSIBLE."
4040 PRINT
4050 PRINT "USE THE ARROWED KEYS
```



```
 (6,8,7","AND 5) TO MOVE EACH LE
TTER INTO","POSITION, AND PRESS
""P"" TO","PARK IT ONCE IT IS IN
 PLACE."
4055 PRINT
4073 PRINT "IF YOU CANNOT USE AN
Y LETTER,","THEN TOSS IT INTO TH
E BIN","ON THE LEFT. ANOTHER WIL
L","REPLACE IT, ALTHOUGH YOU WIL
L","LOSE THE POINTS FOR THE LETT
ER","YOU DISCARD."
4080 GOSUB 5505
4093 PRINT "WHEN YOU HAVE FILLED
 ALL THE","SQUARES, OR AS MANY A
S YOU CAN,","PRESS ""S"" -AFTER
N/L- AND YOUR","SCORE WILL SHOW.
 (AFTER ABOUT ,"15 SECONDS)."
4103 PRINT
4113 PRINT "IF YOU HIT A PARKED
LETTER","WITH ANOTHER ONE, YOU W
ILL LOSE","THE NEW LETTER AND TH
E POINTS","FOR IT. FOR EACH UNFI
LLED","SQUARE, 10 POINTS WILL","
BE DEDUCTED FROM THE SCORE."
4123 PRINT
4133 PRINT "IF YOU RUB OUT ANY S
QUARE WHEN","YOU ARE MOVING LETT
ERS, YOU","SHOULD STILL FILL THA
T SPACE","WITH A LETTER, OR 10 P
OINTS WILLBE DEDUCTED FROM THE S
CORE."
4140 PRINT
4165 PRINT "HAVE FUN -",,"NOW...
."
4150 GOSUB 5000
4173 RETURN
5555 REM PAGE CHANGE
5513 SLOW
5523 FOR I=1 TO 12
5533 PRINT AT 21,3,"[illegible]",A
T 01,3,"            ",AT 21,0,"PRES
S N/L",AT 21,0,"                ";AT 21
,3;"[illegible]"
5040 NEXT I
5050 INPUT O$
5063 CLS
5073 RETURN
5300 STOP
9033 SAVE "SCRIBBL▀"
9513 RUN
```

NOTE LINE 2095=ALTERNATE GRAPHIC 'A' AND GRAPHIC "M"

Figure 1

Figure 2

Figure 3

Scribble
by Ron Luxton

Bannars

on Spectrum

This is a very simple but effective program for the Spectrum and Printer.

You will see that it can produce very effective banners and notices.

The program uses the *Point* function provibed as a keyword on the Spectrum, but not explained in the manual. By using this technique it is easy to incorporate user-defined graphics into the print-out.

Wider letters can be made by extending the loop set up by line 60.

```
 10 REM **SPECTRUM BANNERS**
 20 REM © RayBrad MCMLXXXIII
 30 INPUT "Type Text (up to 32
chrs) and   ENTER",a$
 40 PRINT AT 0,0;a$
 50 FOR x=0 TO LEN a$*8-1
 60 FOR g=1 TO 8
 70 FOR y=168 TO 175
 80 FOR z=1 TO 4
 90 IF POINT (x,y)=1 THEN LPRIN
T "█";
 100 IF POINT (x,y)=0 THEN LPRIN
T " ";
 110 NEXT z
 120 NEXT y
 130 NEXT g
 140 NEXT x
```

Banners
by Ray Bradley

Triangle

on BBC Micro

This simple program for the BBC Micro calculates the area of a triangle. It is designed to have some educational value in that it shows you how the formula is used

```
10 REM BY IAN BROWN AND STEPHEN
                        LOWES
20 MODE 2
30 VDU19,1,0,0,0,0,19,0,2,0,0,0
40 GCOL0,3
50 MOVE200,400
60 DRAW200,850
70 DRAW 500,400
80 PLOT85,200,400
90 MOVE 800,400
100 DRAW 1000,850
110 DRAW 1200,400
120 PLOT 85,800,400
130 GCOL0,4
140 MOVE100,400
150 DRAW100,850
160 MOVE 70,440
170 DRAW 100,400
180 DRAW 130,440
190 MOVE 70,810
200 DRAW 100,850
210DRAW 130,810
220 MOVE 700,400
230 DRAW 700,850
240 MOVE 670,440
250 DRAW 700,400
260 DRAW 730,440
270 MOVE 670,810
280 DRAW 700,850
290 DRAW 730,810
300 PRINTTAB(0,12)"H"
310 PRINTTAB(9,12)"H"
320 PRINTTAB(4,1)"TRIANGLE AREA"
330 PRINTTAB(3,20)"BASE         BASE"
340 COLOUR1
350 PRINTTAB(3,22)"Equation used"
360 PRINTTAB(0,24)"AREA=0.5 X BASE
    X H"
370 PRINT
380 INPUT"INP.BASE";B
390 INPUT"INP.H";H
400 A=0.5*B*H
410 COLOUR 9
420 PRINT
430 PRINT"  AREA=";A
440 COLOUR 1
450 PRINT
460 INPUT"        AGAIN (Y/N)";Y$
470 IF Y$="Y" THEN GOTO 20
480 MODE 7
490 CLS
500 END
```

Triangle
by Ian Brown

Stomper

on Spectrum

This game requires both speed and logical thought. There are six skill levels and successive frames become faster and faster.

The problem before you is to control a boot in order to stamp out the ever shortening fuse on a series of bombs. When you have managed this a new frame begins with faster burning fuses.

Your boot moves around the screen using stepping stones which disappear once they have been used. Wrap around operates in all directions and becomes essential at the higher skill levels.

If things become really difficult two extra controls allow you to rotate the line on which you are sitting either left or right independently of the boot. However just to make life a little more difficult there are four skulls at random positions on the screen; hitting one of these will send your boot crashing to the bottom of the screen.

There is a facility for recording the name of the highest scorer. The controls are as follows:

- f move left
- e move right
- w move up
- s move down
- 1 rotate line left
- 0 rotate line right

The main routines in the program are all *Rem* labelled. When making any alterations to the program it is worth remembering that several of the variables are used more than once to help keep the program running at a reasonable speed.

Due to the large graphic display there is no room on the screen for a running display of the score, this is displayed at the end of each frame. You score for every stepping stone and each bomb. The bombs score higher the quicker they are stamped out.

As the game progresses and the fuses burn faster these scores increase so some pretty impressive scores are possible on the lowest levels.

PROGRAM OF THE WEEK

```
   5 DIM l(16): RANDOMIZE : GO
UB 9000: GO SUB 4000: LET score
0: LET level=1: LET hi=0
  10 PAPER 7: INK 3: BORDER 7
  20 LET cnt=0: CLS
  99 REM *****DRAW SCREEN******
 100 FOR a=0 TO 21 STEP 2
 115 FOR b=0 TO 31 STEP 2
 120  PRINT AT a,b;"■";AT a+1,b
;"■"
 130 NEXT b: NEXT a
 145 REM *****DRAW SKULLS******
 150 FOR i=1 TO 4: LET a=1+INT (
RND*8)+8*(i=3 OR i=4): LET b=1+I
NT (RND*8)+7*(i=2 OR i=4)
 160 PRINT AT a*2,b*2; INK 0;"
";AT a*2+1,b*2;"
 170 NEXT i
1000 REM ******MOVE BOOT*******
1010 LET a1=0: LET b1=0
1020 GO SUB 8600: GO TO 2010
1030 GO SUB 8600: IF INKEY$="" T
HEN GO TO 1030
1040 IF INKEY$="s" THEN LET b1=b
-2: LET a1=a: IF b1<0 THEN LET b
1=30
1050 IF INKEY$="e" THEN LET a1=a
+2: LET b1=b: IF a1>20 THEN LET
a1=0
1060 IF INKEY$="w" THEN LET a1=a
-2: LET b1=b: IF a1<0 THEN LET a
1=20
1070 IF INKEY$="d" THEN LET b1=b
+2: LET a1=a: IF b1>30 THEN LET
b1=0
1080 IF INKEY$="1" THEN GO SUB 7
000: LET l(a+1)=l(a+1).2*level: LET
 a1=a: LET b1=b: GO TO 1110
1090 IF INKEY$="0" THEN LET l(a+
1)=l(a+1).2*level: GO SUB 7500: LET
 a1=a: LET b1=b: GO TO 1110
1100 IF ATTR (a1,b1)=56 THEN GO
TO 1030
1110 IF ATTR (a1,b1)=56 THEN GO
TO 5000
```

```
1120 IF ATTR (a1,b1)=67 THEN LET score=score+((a*3+100)+level: LET cntr=cntr+1: GO SUB 8500
2000 PRINT AT a,b; INK 4;" ";AT a+1,b; INK 4;" "
2010 LET a=a1: LET b=b1
2020 PRINT AT a,b; INK 3;" ";AT a+1,b;" ": BEEP .003,5: LET score=score+2+level
2025 [illegible]
2030 GO TO 1030
4000 REM ********TITLES********
4010 BORDER 2: PAPER 6: INK 0: CLS : PRINT AT 8,12;"STOMPER";AT 5,13;"by";AT 10,8;"Barry M Clayton"
4020 PRINT AT 12,12;"©1983"
4030 PAUSE 50: LET t$="
4040 FOR i=1 TO 12: PRINT AT 0,i;" ";AT 1,i;" ": BEEP .05,i: PAUSE 5: NEXT i
4050 [illegible]
4060 PRINT AT i,0; PAPER 2; INK 0;t$: BEEP .05,1: NEXT i
4070 FOR i=1 TO 150: NEXT i
5000 REM ******DIFFICULTY******
5010 POKE 23692,255: PRINT AT 21,0
5020 PAPER 7: PAUSE 5
5030 PRINT TAB 6; INK 3;"HOW BRAVE ARE YOU ?": PAUSE 5
5040 PRINT TAB 9;"1)DEAD EASY": PAUSE 5
5050 PRINT 'TAB 9;"2)EASY": PAUSE 5
5060 PRINT 'TAB 9;"3)MODERATE": PAUSE 5
5070 PRINT 'TAB 9;"4)DIFFICULT": PAUSE 5
5080 PRINT 'TAB 9;"5)VERY DIFFICULT": PAUSE 5
5090 PRINT 'TAB 9;"6)IMPOSSIBLE": PAUSE 5
5100 PRINT ': PAUSE 5: PRINT ': PAUSE 0: PRINT TAB 9;"PICK A NUMBER"
5110 LET a=CODE INKEY$: LET a=a-48: IF a<1 OR a>6 THEN GO TO 5110
5120 LET diff=3*(a=1)+8*(a=2)+7*(a=3)+10*(a=4)+12*(a=5)+20*(a=6)
5130 RETURN
6000 REM ******NEXT STAGE******
6010 LET t$="11224": FOR i=1 TO 4: BEEP .2,VAL t$(i): BEEP .4,VAL t$(i+1): NEXT i
6020 FOR i=1 TO 300: NEXT i: LET level=level+1: CLS : PRINT AT 5,10;"LEVEL ";level: RESTORE : PRINT : PRINT TAB 8;"SCORE= ";score: PAUSE 100: GO TO 20
7000 REM *****ROTATE LEFT******
7010 LET t(16)=ATTR (a,0)
7015 FOR i=1 TO 15: LET t(i)=ATTR (a,i*2): NEXT i
7020 FOR i=15 TO 0 STEP -1
7030 IF t(i+1)=58 THEN PRINT AT a,i*2; INK 2;" ";AT a+1,i*2;" ": GO TO 7100
7040 IF t(i+1)=60 THEN PRINT AT a,i*2; INK 4;" ";AT a+1,i*2;" ": GO TO 7100
7050 [illegible] PRINT AT a,i*2; INK 0;" ";AT a+1,i*2;" ": GO TO 7100
7060 IF t(i+1)=67 THEN PRINT AT [illegible]
[illegible]
7090 IF i1<0 THEN LET i2=15
7100 NEXT i
7110 RETURN
7500 REM *****ROTATE RIGHT******
7510 LET t(1)=ATTR (a,30)
7520 FOR i=0 TO 14: LET t(i+2)=ATTR (a,i*2): NEXT i
7530 FOR i=0 TO 15
7540 IF t(i+1)=58 THEN PRINT AT a,i*2; INK 2;" ";AT a+1,i*2;" ": GO TO 7600
7550 IF t(i+1)=60 THEN PRINT AT a,i*2; INK 4;" ";AT a+1,i*2;" ": GO TO 7600
7560 IF t(i+1)=56 THEN PRINT AT a,i*2; INK 0;" ";AT a+1,i*2;" ": GO TO 7600
7570 IF t(i+1)=57 THEN PRINT AT a,i*2; INK 1;CHR$ (144+time);AT a+1,i*2;" ": LET y1=y1+1
7580 PRINT AT a,b+2; INK 4;" ";AT a+1,b+2;" "
7590 IF y1>15 THEN LET y1=0
7600 NEXT i
7610 RETURN
8000 REM *****HIT SKULL******
8005 PRINT AT a,b; INK 4;" ";AT a+1,b;" "
8010 FOR i=a1 TO 20: PRINT AT i-1,b1; INK 4;" ";AT i+1,b1;" "
8020 PRINT AT i,b1; INK 3;" ";AT i+1,b1;" "
[illegible] BEEP (21-i)/300,30-i: NEXT i
8040 FOR i=162 TO 135 STEP -1: PRINT AT 21,b1; INK 3; OVER 1;CHR$ i;CHR$ (i+1);AT 20,b1; OVER 1;CHR$ (i+2);CHR$ (i+3)
8050 NEXT i
8060 PRINT AT 20,b1;" ";AT 21,b1; INK 3;" "
8070 GO TO 9500
8200 REM *****EXPLOSION******
8210 BORDER 0: PAPER 0: RANDOMIZE USR 23300: BEEP 1,0: BEEP 1,0: BEEP .2,0: BEEP 1.1,0
8220 GO TO 9500
8500 REM *****DRAW A BOMB******
8505 IF cntr<diff THEN RETURN
8510 LET time=0: LET x1=INT (RND*10): LET y1=INT (RND*15): IF x1<1 OR ATTR (x1*2,y1*2)<>56 THEN GO TO 8510
8520 PRINT AT x1*2,y1*2; INK 1;" ";AT x1*2+1,y1*2; INK 1;" "
8530 RETURN
[illegible] REM *****BURN THE FUSE*****
8610 LET time=time+.01*level: IF time>7 THEN GO TO 8200
8620 PRINT AT x1*2,y1*2; INK 1;CHR$ (144+time)
8630 RETURN
9000 REM *****GRAPHICS*******
[illegible] DATA 96,112,56,31,62,22,18,15
9030 DATA 31,104,238,100,0,0,2,0
9040 DATA 96,112,192,128,128,128,128,128
9050 DATA 142,240,16,48,0,0,0,0
9060 DATA 32,16,16,12,4,4,0,16
9070 DATA 48,120,120,48,0,0,0,0
9080 DATA 152,248,248,248,248,248,255,255
9085 DATA 0,0,0,0,0,0,192,240
9090 DATA 255,255,255,224,0,0,0,0
9100 DATA 240,224,240,224,0,0,0,0
9110 DATA 0,0,0,136,199,144,188,207
9120 DATA 62,255,33,1,0,17,0,0,1,0,3,237,176,61,38,32,244,201
9130 FOR n=144 TO 152: FOR i=0 TO 7: READ a: POKE USR CHR$ n+i,a: NEXT i: NEXT n
9140 [illegible]
9150 RESTORE 9060: NEXT n
9160 RESTORE 9070: FOR i=0 TO 7: READ a: POKE USR "u"+i,a: NEXT i
9170 FOR n=152 TO 156: FOR i=0 TO 7: READ a: POKE USR CHR$ n+i,a: NEXT i: NEXT n
[illegible] FOR i=23300 TO 23317: READ a: POKE i,a: NEXT i
9190 RETURN
9500 REM *****END OF GAME*****
9505 PAUSE 50: BORDER 1: PAPER 5: INK 2: CLS
9510 PRINT AT 5,9;"YOU SCORED ";AT 7,11;score
9520 IF score>hi THEN LET hi=score: PRINT '"Congratulations that is the best score today.Please type in your name followed by enter": INPUT h$: GO TO 9560
9530 IF score=hi THEN PRINT '"Well done you equalled ";h$;"'s high score.Better luck next time.": GO TO 9560
9540 LET t$=STR$ (hi-score): IF VAL t$>6000 THEN LET t$="a long way"
9550 PRINT : PRINT TAB 4;"You were ";t$;" short of ";'TAB 5;h$;"'s high score."
9560 PRINT AT 18,0;"WOULD YOU LIKE ANOTHER GAME(Y/N)"
9570 IF INKEY$="" THEN GO TO 9570
9590 IF INKEY$="y" THEN LET score=0: LET level=1: LET cntr=0: GO SUB 5000: GO TO 10
9600 IF INKEY$="n" THEN STOP
9610 GO TO 9570
```

Stomper
by B Clayton

OPEN FORUM

Screen Dump

on BBC Micro

This procedure takes a little over a minute to produce a screen dump to an Epson printer — *much* faster than many previously published programs in Basic. A machine code dump would be about as fast but would take much longer to type and unless you are familiar with machine code, mistakes would be difficult to find and correct. The screen is copied on to the paper sideways — ie turned through 90 degrees — which will be adequate for most purposes.

The procedure is short enough to be typed in as part of another program but an alternative would be to store it on tape as a procedure which can be added to programs using the method explained on page 402 of the BBC Micro User Guide. In either case the procedure would be called by a *Procdump* statement in the main program.

The procedure uses three loops each using integer variables for greater speed. The D% loop steps across the screen horizontally one character space at a time. Inside this the A% loop steps up the screen vertically one character at a time and lastly inside this loop the B% loop steps up the eight bytes which make up each character taking one byte at a time. This means that the screen is copied to the printer starting at the bottom left-hand corner going up the column to the top left-hand corner then returning to the next character position at the bottom for the next column and so on. The output to printer of each byte occurs at line 10090 with the use of the operator

```
10000 REM *** MODE 4 MX80 F/T III DUMP by A.PIPER ***
10010 DEFPROCdump
10020 LOCAL A%,8%,D%
10030 VDU2
10040 VDU1,27,1,65,1,8
10050 FOR D%=22528 TO 22840 STEP 8
10060 VDU1,27,1,75,1,0,1,1
10070 FOR A%=D%+9920 TO D% STEP -320
10080 FOR 8%=A%+7 TO A% STEP -1
10090 VDU1,?8%
10100 NEXT B%:NEXT A%
10110 VDU1,10
10120 NEXT D%
10130 VDU3
10140 ENDPROC
```

Screen Dump
by A Piper

Adventure clues

Having returned from a couple of weeks sunbathing on a beach at the end of Europe I find a stack of mail about to reach the ceiling! So let's have a good old round-up of a sizeable portion of it

The ongoing saga of the Oric adventure *Zodiac* from Tansoft takes a new turn this week Just a couple of weeks after W J Bailey had written to tell me that I Fletcher couldn't possibly have found 10 signs half of them being red herrings, he has written again This time his letter starts "Contrary to my previous letter ..."!

So apologies are due to Mr (I think) Fletcher — rest assured that there are indeed 12 signs and you will need all of them in order to gain the sixth and final treasure which will be revealed to you in a burst of glory

Geoff Phillips, author of *The Zodiac* has also written again to confirm all this and also to tell me that there is indeed a red herring in the adventure A R Thompson, of Sheffield seems to have found another apart from the official Scarlet Winged Heron (well you work it out!) A case of red herrings under the bed!

Incidentally a lot of people have asked when *The Hobbit* will appear on the Oric — well the news is that late September is the projected release date Now you Oric owners have a real treat to look forward to — and let's hope that Melbourne House have used the time to learn how to spell Adventurer!

Straight on now to the *Hobbit Hall of Fame* and the people who have recently completed the "Adventure of Adventures"

Ted King
Peter Gleed
Richard Shaw
R Humby
Bill Longley
Martyn Sudworth

Bill Longley (who seems to crop up all over the place!) would like me to pass on a tip that might save many struggling Bilbos a lot of time — "wear the magic ring when examining the Magic Door in the Elveking's Halls"

A lot of people are still like Alex Dalcado of NW8 having trouble with that pesky Goblin's Dungeon Alex we covered all that in *PCW* No 29! But to recap very briefly you must follow the program's advice and ask a friend to help Stuart Alder wants the Bard to kill the Dragon as in the book Try killing the Dragon before collecting the treasure Stuart!

R W Humby also from the *HHOF* brings a couple of new *Hobbitbugs* to our attention If you have your ZX printer attached and type *Jump* while in the Wood Elf's Dungeon then the program will crash and the printer continuously *Print* out Run Run Run (maybe that's a hint from the computer's subconcious) The other bug is not so serious — when the player is in the barrel in the Wood Elf's cellar and types *Open* providing he/she hasn't previously entered Beorn's cupboard the program will then reply "you see an open cupboard — in it is food" R W doesn't tell me if you can then *Take* and *eat the food*, but it will make for an interesting experiment when I'm less busy!

Many of the people who let me know of their progress in various adventures send along maps and responses they've given while playing Jim Clavier whose name appeard in the *HHOF* a few weeks ago has kindly sent me a beautifully-produced solution to *The Hobbit* which is a real labour of love and most impressive In common with other adventurers he has also given me lots of tips on solving the game I can't print all these at once but rather, they slowly come out over the weeks in answer to all the pleas for help that I get

This prompts me to give a few words of encouragement to anybody currently stuck fast in an adventure I get many letters saying in essence, "I'm fed up with this game — I can't get anywhere and am seriously thinking of giving up adventures for good" But then the next letter will say "For weeks I struggled over a certain point and suddenly all became clear and I was on to the next location" All I can add is adventures are meant to be hard problems to solve and if you read this column regularly you should eventually pick up some clues for your adventure

To complete our look at *The Hobbit* (for this week) Rajesh Patel of Oldham has asked me several questions The one regarding *The Hobbit* that I can answer is "How do I get past the bulbous eyes on the Forest Road after collecting the Treasure and of what use is the Magic Door?" I'll use the letter-transposing trick that featured in the column some weeks ago Starting at the *second* letter of the group read off every alternate letter — when you get to the end you must return to the *first* letter and repeat the process This should be a slight obstacle to those adventurers who don't want to see the solution just yet!

To get along the Forest Road

TWHAEINTWWEASITT

And at the Magic Door:

EWDEOAORRRWIANIGTETXHAEMNI GNO

Finally this week, regular readers may like to know that I've really managed to collect one of the rings in the arcade adventure *The Halls of Things* from Crystal Computing Contrary to my expectations, no trumpets sounded, no flags waved in fact it was rather anticlimatic, but I did gain 1000 points for the achievement, which made poor old Kickaha's hi-score of 100 seem positively puny!

There are of course, several more rings to get before I can progress to the ultimate level — but I'll enjoy every minute of the quest! On the subject of Hi Scores incidentally, wouldn't it be nice if more software writers would give the player a *Save* routine for arcade scores? ■

Are you stuck in an adventure? Are you faced by a problem that seems insurmountable? *Adventure Helpline* may be the answer

Adventure Helpline is quite simply designed to put adventurers in touch with one another Where you may be stumped by a baffling puzzle a fellow adventurer may be able to help By the same token you may be able to help other people with their problems

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ON AND OFF

D J Mills of Farm Avenue, Chislehurst, Kent writes

Q **I don't know if you can help me, but I remember seeing some while ago a device that allowed any computer to control some ordinary 13 amp plug sockets. This would enable me to turn lights on and off, etc. I took the details at the time, but rather stupidly I have lost them. Can you tell me who to contact? By the way my computer is a BBC A.**

A I know the feeling. I have lost count of the number of names and addresses I have noted down and subsequently mislaid. I think the company you are looking for is S J Research. They can be found at Philip Spencer Jones Associates Ltd, 108 Mill Road, Cambridge CB1 2BD.

SPEED MEASURE

Stephen Jones of Walsall writes

Q **I find the slowness of my ZX81 annoying. Is there any way to find out how fast a micro is? Is the speed of a micro measured in KHz?**

A Speed is relative in that a ZX81, for example, will not perform as many functions in the same time as another computer. The only way you can measure the speed on the computer is to set several computers the same task and see how long they take. The sort of test program needed would be like the one following.

```
10 FOR Z = 1 TO 50
20 PRINT Z
30 CLS
40 NEXT Z
```

This takes about 40 seconds in *Slow* and about 11 seconds in *Fast*. Run this on other micros that use Basic and it will show how well the ZX81 compares against other machines. However a range of tests would have to be done, as each micro has its own strengths and weaknesses.

The speed of a processor measured in KHz does affect the speed of a computer but this is not the whole story. On a Z80 chip for example half the time is spent *Refreshing* the memory. On say a 6502 the relevant register does not exist — it has a special chip which leaves the processor more time to do other things.

Speed also depends on how each computer uses the CPU. An operation that takes eight instructions to execute on one computer might only take four on another computer using the same CPU and executing the same Basic command. It boils down to how each individual computer is set up, so the fastest time might not always be the fastest to do things.

SCREEN$ FUNCTION

David John McClinnon of Highlands Road, Bromley Cross, Bolton writes

Q **How do I use the *Screen$* function in a game such as *Space Invaders*? I have tried *Screen$ (x,y) = " "* Then but it does not work. Could you please tell me the formula on an x/y basis to convert *Plot* x,y to *Print* x,y.**

A Your problem with *Screen$* seems to be a question of syntax. You have forgotten the *If* and you do not need the inverted commas. *Screen$* returns a numeric value between 32 and 127 only because it will only read the conventional Ascii values so such things as block graphics or user defined graphics cannot normally be read.

The correct form of the line you have above would be *If Screen$ (x,y) = n Then*. To use user defined graphics with this command you would have to fool the computer into thinking that they started at *Code* 32.

I am not sure what you are getting at in your second question because *Print* and *Plot* have very different resolutions, and the numbering of the y axis is different running from 0 at the top of the screen in *Print* mode while 0 is at the bottom in *Plot* mode. The dimensions in *Print* are 22 × 32, whilst those of a *Plot* screen are 176 × 255.

8K MEMORY

Julie Hancock of Purser Road, Northampton writes

Q **I have a question about computer memory. I recently purchased an 8K memory expansion for my Vic20 and discovered, to my dismay, that programs written for the unexpanded memory no longer run with the cartridge plugged in. Because of this, a relocation program must be used for all memory expansion below 8K.**

In the light of this, I would like to know if a similar problem arises with the 16K and 48K Spectrum, in the same way that it does with the 1K and 16K ZX81. I would like to know as I intend to buy a 48K Spectrum soon and I would like all 16K programs to run on it without having to convert them.

A This is a problem that is concerned with the way that the Vic20 and the Spectrum lay out their memory maps. If the onboard Ram on the Vic20 exceeds 8K then it no longer fits into the bottom 8K block so a certain amount of re shuffling has to be done by the system.

When you have more than 8K on the Vic20 then the screen is moved so that it occupies the 4K between 4096 and 8191. The system variables stay at the bottom but all the user Ram will start at 8192 and work up from there. Just why Commodore adopted this memory layout is best known to them.

This problem does not occur with the Spectrum since the memory layout is a lot more straightforward. The user available Ram is in the middle — the program works up, and the variables work down into the space. This is true whether it is a 9K user available space, as on the 16K Spectrum, or a 40K user available space, as on the 48K Spectrum. It is only in rare cases, such as lowering Ram top that there might be problems. If these do occur, then the memory map in the manual should be able to help you.

X/Y PLOTTER

Sukhbir Singh of Mulberry Crescent Glasgow writes

Q **Having recently got bored with computer games for my ZX Spectrum I decided to buy an I/O board. To put it to use, I have built myself an x/y plotter. The principle is simple, a motor driving a vertical carriage. A pen is inserted where both axis meet.**

The problem I have is how to change the direction of the motors. I know a number of ways of doing this mechanically, but these are of no use. I need it done electronically. Can you help?

A It is good to see that someone who has got bored with games chooses to develop his skills rather than moan about software and I wish you every success. I had a word with Stephen Adams and this is what he came up with.

You will have to use D/C because A/C cannot be reversed. The best option is a pair of transistors acting alternately, one in each direction of the current.

One wire would need to be connected to the motor and the other to 0 volts. Obviously they would not be wired to each other. The wiring would also need to be reversed so where one would have *a* wired to 0 and *b* to the live voltage the other would have *a* as the live line and *b* as the 0.

You would then have to use the output port to turn one or other of the circuits on depending on which direction you wanted to move the plotter.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke*, *PCW*, 12-13 Little Newport Street, London WC2R 3LD.



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DRAGON 32 SOFTWARE for sale Tel (0922) 621616 (Mark Davis)

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ATARI VCS in excellent condition with all accessories + four cartridges £85 ono Tel High Wycombe (0494) 36484

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VIC20 + **C20 CASSETTE RECORDER,** Introduction to Basic Part 1 £56 worth of games £125 or swap 48K Spectrum with cassette Tel 0226-744 824

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VIC20 + Introduction to Basic Part II cassette recorder machine code monitor super expander programmers aid 16K Ram pack four-slot MB speech synthesiser decks dust cover £340 ono Tel 064 32 53344

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CBM PET 8032 + disk drive 8050 share Tel Leighton Buzzard 371713 evenings

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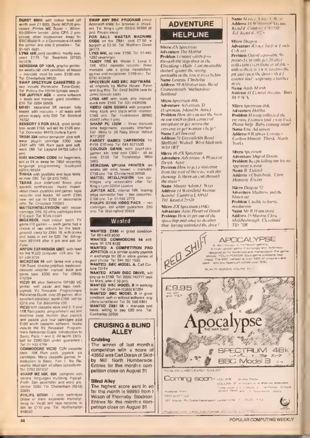
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LYNX 48K with leads and manual quick sale £160 Tel 031 4494690

VIDEO GENI EG3003 with programming book and black-white monitor £160 ono Tel Huddersfield (0892) 46862 (after 6 pm)

SHARP PC 1200M + three manuals (one beginners) cassette interface £45 Write to 24 Raby Street Belfast BT7 2GY

PARSET GAMES CARTRIDGE for P159 £10 ono Tel 041 5571533

COLOUR GENIE with joysticks games etc total cost £300+ all as new £150 Tel Trowbridge Wilts 3965

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WANTED ATARI DISC DRIVE, will pay up to £150 Tel 0225 742777 (ask for Mark after 6 30 pm)

WANTED BBC MODEL B in working order Tel Durham (0385) 67254

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WANTED ZX81 1K + manuals and leads willing to pay £20 ono Tel Camberley 32506

CRUISING & BLIND ALLEY

Cruising

The winner of last month's competition with a score of 43552 was Carl Doran of Skidby Mill North Humberside Entries for this month's competition close on August 31

Blind Alley

The highest score sent in so far this month is 99955 from I Wilson of Thornaby Stockton Entries for this month's competition close on August 31

ADVENTURE HELPLINE

Micro *ZX Spectrum*
Adventure *The Hobbit*
Problem *I cannot safely pass through the trap-door in the Elvenking's Halls I am invariably dashed against the strong portcullis in the forest river below*
Name *Graeme Chisholm*
Address *59 Abbotsgrange Road Grangemouth Stirlingshire Scotland*

Micro *Spectrum 48K*
Adventure *Adventure D (Espionage Island by Artic)*
Problem *How do you use the boat or use torch in dark corner of aeroplane or get across the crevasse or get woman's help?*
Name *Carl Inwood*
Address *51 Greenfields Road Shelfield Walsall West Midlands WS4 1RT*

Micro *16 ZX Spectrum*
Adventure *Adventure A Planet of Death Artic*
Problem *How to get a stalactite from the roof of the cave with the drawing Is there an exit through the maze?*
Name *Master Adam J Wras*
Address *14 Wattsfield Avenue Kendal Cumbria LA9 5JJ Tel Kendal 25328*

Micro *ZX Spectrum (16K)*
Adventure *Artic Planet of Death*
Problem *How to get out of the spaceship and what to do after that having unlocked the door?*

Name Master Adam J Wras
Address 14 W... Avenue Kendal Cumbria LA9 ... Tel Kendal ...

Micro *Dragon*
Adventure *Raider of the Lost Ark (Colour)*
Problem *Out of a possible 50 points I can only get 20 after collecting everything possible – unless there is a way to cross the pit and open the door – that I cannot find – exposing a further maze*
Name *Andy Marsh*
Address *41 Central Avenue Bury BL9 9JX*

Micro *Spectrum 48K*
Adventure *Hobbit*
Problem *Having collected the treasure I cannot find a way back Please help Baby coming soon!*
Name *Eric Adamson*
Address *9 Railway Cottages Carlton Miniott Thirsk North Yorks*

Micro *Spectrum*
Adventure *Ship of Doom*
Problem *Keeps killing me for no apparent reason*
Name *R Lylord*
Address *3 Churchside Clyst Honiton Exeter*

Micro *Dragon 32*
Adventure *Madness and the Minotaur*
Problem *Unable to locate mushroom*
Name *Mr R Hammond*
Address *18 Maston Close Middlesbrough Cleveland TS5 7JR*

NEW RELEASES

A RARITY



Arena III is that rarest of all animals a game for the TI99/4A

Wonderful as many of the computer's specifications are independent software for the Texas is almost non existent Lizard Games seem to be one of the very few houses specialising in Texas programs

On *Arena III* your mission is to claim the newly discovered planet Argar for the Federation

This involves travelling through the Zalta galaxy which is patrolled by Galactican raiders bent on self-destruction When you arrive tired and exhausted over Argar you must clear a landing strip and descend avoiding the meteor storms to plant the Federation Flag

Program *Arena III*
Price *£5*
Micro *TI99/4A*
Supplier *Lizard Games*
14 Bridgewood
Brookside
Telford
Shropshire

ARCADE

The animated graphic adventure has to be the next objective for major software companies

Quicksilva s *Xadom* gives you arcade like controls left, right, up down and fire (strike) but in an adventure setting

The screen displays a bleak alien landscape at the end of which are three cosmic gates — you must fight off the various evil monsters that live in each domain and pass through one of the gates

Like adventures there are various objects you can pick up along the way and mazes where you can get lost like arcade games you must be quick on the keys to avoid or kill the nasties — what to call it? An arcade game? An adventure?

Program *Xadom*
Price *£6 95*
Micro *Spectrum 48K*
Supplier *Quicksilva Ltd*
13 Palmerston Road
Southampton
SO1 1LL

MULTI-LEVEL

Slowly the larger companies are losing interest in the ZX81 machine to concentrate on its more sophisticated brother But now software is still appearing from some of the smaller firms

Such a tape comes from Geoff Lee — a games selection with a multi level version of *Awari* called *Stones* and a card puzzle called *Open Patience*

Program *Tape 1*
Price *£4 90*
Micro *ZX81 (16K)*
Supplier *Geoff Lee*
5 Westbourne Road
Islington
London N7

HISTORY

Battle of Britain is a Kingdom type program in which you fight off the deadly hun with your few brave lads

Up to 12 people can play the game each taking charge of a city and defending it from attacks by scrambling fighter squadrons or electing to use vital raw materials to make more fighters

Depending on how many adversaries you choose to take on the game can last anything from a couple of hours to several days The objective is, of course to repeat history and send the bounders back across the border leaving this sceptered isle free once more for etc etc

Program *Battle of Britain*
Price *£9 95*
Micro *Lynx Sirius Vic20 (16K) ZX81 Spectrum*
Supplier *Mancomp*
112 Cambridge Gate
Regents Park
London NW1 4JN

ZOMBIES

Realm of the Undead is an Arcventure — an arcade game/adventure game hybrid

Your task is to rescue villagers trapped by the Dark Lord You do this by collecting garlic and avoiding vampires tarantulas and zombies

The idea is to mix some of the themes and problem solving of an adventure with the graphics and speed of an arcade game

Program *Realm of the Undead*
Price *£6 95*
Micro *Spectrum 48K*
Supplier *Express Programmes Company*
Express House
City Road
Bradford
West Yorkshire BD8 8ER

SAME NAME

Return of the Jedy is an arcade type game for the Spectrum 48K

The title, as you see is cunningly disguised so you won t realise the game has anything to do with the film of almost the same name

The object of the game is to destroy Darth Vader without also knocking R2D2 on the noddle Together with the game is the promise of a voucher worth £1 off any of the company s other products — if you can beat the high score of 72000

Program *Return of the Jedy*
Price *£5*
Micro *Spectrum 48K*
Supplier *MK Circuits*
63 Felstead Road
Grimsby
S Humberside

ISLAND RACE

The Island is a graphics adventure for the Commodore 64 The setting is a round the world motorbike race This particular leg of the race in the program is set on The Island The suppliers intend to continue the story with subsequent releases (The Island II?)

Program *The Island*
Price *£10*
Micro *Commodore 64*
Supplier *Superb Software*
9b Oval Road
Camden
London NW1

DOTS

Android Attack is not an educational program for the BBC It neither teaches recognitional skills nor vocabulary and you will not be able to learn how to tell the time from it

What you *can* do is kill androids whilst running round a maze

Gradually your energy decreases and you must eat dots and other things that appear in the maze to restore it

Program *Android Attack*
Price *£8 95*
Micro *BBC (32K)*
Supplier *Computer Concepts*
16 Wayside
Chipperfield
Hertfordshire WD4 9JJ

SAINTLY HALO

DURELL software
JUNGLE TROUBLE!
SPECTRUM

If wit counts for anything then Durell Software is on to a winner with *Jungle Trouble*

Although the game itself is addictive as you try to move your little man across stepping stones (avoiding the crocodile) chopping down trees and swinging him over burning pits it is the little touches that make the game

As you try to chop down the trees a monkey comes up to you and tries to steal your axe If he manages it the little man stands there with a forlorn expression looking helpless If, mistiming his jumps, the man tumbles into the swamp and is eaten by the crocodile, a little halo appears — fans of *The Saint* will soon see the joke

Program *Jungle Trouble*
Price *£5 90*
Micro *Spectrum 16/48K*
Supplier *Durell Software*
Castle Lodge
Castle Green
Taunton TA4 1AB

SPRITELY

One of the reasons people like Ultimate Play the Game are able to get such good graphics out of the Spectrum is that they have written Sprite routines for it

Sprite handling (moveable pre-defined graphics shapes) is a facility that comes as standard on some other machinery like the TI or Commodore 64

Now *48K Sprite* makes them available for people who aren't expert enough at machine code to write their own graphics routines

The program comprises a Sprite generator program which allows you to construct sprites in the same way as you construct user-defined graphics — saving the date on tape for your own programs The second part of the program is a machine-code routine to *Poke* the data on to the screen

Program *48K Sprite*
Price *£4 70*
Micro *Spectrum 48K*
Supplier *B Sides*
4 Willesden Road
Celnl Glas
Bridgend
South Wales

DARTS

No prizes for guessing that *One Hundred and Eighty* is a computer version of darts, that perennial pub and garage (you never played darts in the garage — where were you?) favourite

Four games are available including Round-the-Clock and 301

The screen displays both the dart board and a side-on view of the passage of the dart which you guide to its target

There is a special reward, should you achieve the magical one hundred and eighty score

Program *One Hundred and Eighty*
Price *£6 90*
Micro *BBC*
Supplier *A & F Software*
830 Hyde Road
Manchester M18 7JD

DYNAMITE

California Goldrush is the title of an intriguing sounding game from Amik You must move Prospector Jake around his 24 territories claiming each one by surrounding it with a fence

The problem is that the surrounding Indians don't much like Jake and they get nastier and nastier in their defence of their land Jake, in his turn, can defend himself by dropping sticks of dynamite at various points — this causes a rock fall which temporarily blocks the Indians' path

The game will be available for the Commodore 64, Spectrum 48K and Dragon 32

Program *California Goldrush*
Price *£7 95*
Micro *CBM 64/Spectrum 48 Dragon*
Supplier *Amik Microsystems*
30 Kingscroft Court
Belhage
Northampton
NN3 4BH

NOT A GAME

THE TIGER GRAND PRIX
AN EDUCATIONAL GAME

You may remember a few weeks back I warned you that Dragon programs were turning educational More evidence for this comes from Tiger Software whose *The Tiger Grand Prix* is not all it seems

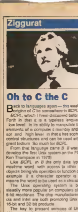
You buy this cassette with a colour cover depicting a racing car imagining yourself zooming round the track your joystick fingers twitch and what do you discover? Your parents are delighted — it s an educational game!

Still, maybe there are compensations The computer shows two cars on a racing track — you must move the cars around the board by throwing dice and answering questions Danger lurks in the form of gremlins who will chase and catch you if you answer the questions wrongly The game (sorry educational program) uses all 32K of the memory and the questions are intended to cover various age ranges from seven to 16

Program *The Tiger Grand Prix*
Price *£7 95*
Micro *Dragon 32*
Supplier *Tiger Software*
63 Devonshire Street
Monkwearmouth
Sunderland
Tyne & Wear

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases Popular Computing Weekly 12 13 Little Newport Street London WC2R 3LD

Ziggurat



Oh to C the C

Back to languages again — this week C The origins of C lie somewhere in BCPL

BCPL, which I have discussed before is like Forth in that it is a typeless language It is low level in its ability to manipulate the basic elements of a computer s memory and processor and high level in that it has sophisticated control structures and can be used without too great tedium So much for *BCPL*.

From that language came *B* It was used to develop the first Unix system on the PDP 7 (by Ken Thompson in 1970)

Like *BCPL* in *B* the only data type is the machine word with access to other kinds of objects being via operators or function calls For example if a character operator is used it means the word to be used as a character

The Unix operating system is becoming steadily more popular on computers other than 8-bit machines The chip manufacturers Motorola and Intel are both promoting Unix for their 16-bit and 32 bit products

The key to present versions of Unix is *C* Although the first version of Unix was written in *B* *B* has produced *C* and *C* has spawned the current Unix systems

C since it derived partly from *B* is similar to *BCPL* in some respects But *C* is not just another variant of *BCPL* It is more human in that it has certain fundamental data objects which go beyond the mere machine word (as a Forther I am not always too sure whether that is an unmixed blessing)

These data objects are characters integers of several sizes and floating-point numbers (the value of 3 5 is 0 because 3 and 5 are created as integers but 3 0 5 0 is 0 6) On top of these basic structures are derived-types using pointers as well as arrays and more complex structures

Almost all Unix software is written in *C* B W Kernigham and D M Ritchie in *The C Programming Language* note that of the 13000 lines of system code in Unix only about 800 lines are written in assembler

C programs tend to be sufficiently efficient to make the writing of machine code programs superfluous *C* offers straightforward control structures tests loops grouping and subroutines but nothing beyond that — such as multi-programming parallel operations, and similar

C is relatively small a compiler for *C* can be simple and compact (as with Forth) and can be easily written

As a language *C* reflects the capabilities of current computers — it is not waiting for any fifth generation to make it fully viable (which seems to be the case with Prolog) Kernigham and Richie claim that *C* is so efficient that one of them (who?) does not know and has not needed to know the PDP 11 assembly language for the original Unix host machine

Want to see a program?

```
main()
{    printf( Ziggie RAT\n )    }
```

A *C* program — however large or small — is composed of one or more functions which specify what has to be done *Main* is a special function like *Start* in *BCPL*, which has to appear in a *C* program

The curly braces { and } enclose the body of the routine and the ordinary parentheses (and) give a list of parameters In this case *main* has no parameters

Printf is a library function with its parameter being Ziggie RAT\n The strange symbol pair \n (which stands for one character) means newline Powerful huh?!

Try to work out what this function does

```
FUNCTION(x)
int x
{ int p
  for (p = 1  x > 0  --x)
    p = p * x
  return(p)
}
```

Answers next week Note that *C* uses = rather than the := of Pascal, and Algol ■

Boris Allen

Puzzle

A mystic property

Puzzle No 70

In line with many other stately homes, the seat of the Seventh Marquis of Mulberry has recently been opened to the public. Its grounds were landscaped by Capability Brown in 1763, under the direction of the eccentric Third Marquis

This eccentricity was no doubt due in part to his overwhelming interest in the mystic property of numbers. As a result of which he directed that the four triangular flower beds, one at each corner of the house was to have the same number of yards in its perimeter as it had square yards in its area.

This Capability found curious behaviour It also posed him a problem until the Marquis showed him how to solve it. Eventually he was able to design the flower beds such that each was a different size, and such that the sizes were to be the four smallest possible What were their dimensions?

Solution to Puzzle No 65

The lowest six-figure number which still has the same number of figures after being divided by seven is 700000 The program begins with the number and tests it to see if it satisfies the conditions of the puzzle If not the number is increased by seven and the process repeated.

```
10 FOR Y=700000 TO 999999 STEP 7
20 LET X=Y/7
30 LET S=X*8
40 LET X$=STR$(X)
50 LET S$=STR$(S)
60 IF LEFT$(X$,3)=RIGHT$(S$,3) AND
   RIGHT$(X$,3)=LEFT$(S$,3) THEN PRINT "Original
   number= " Y " Number/7= " X, " Number/7*8 = " S
70 NEXT Y
```

This gives answers of 999999 142857 and 857142 respectively

It is worth noting that 142857 is a funny number Try multiplying it by different figures from 1 up and see what you get

Winner of Puzzle No 65

The winner is Norman Kaye Park Drive, Warrington Stoke-on-Trent, who receives £10

Top 10

Atari

1	(2)	Miner 2049'er	(Big Five)*
2	(—)	Necromancer	(Synapse)†
3	(9)	Preppie 2	(Adventure International)†
4	(—)	Combat Leader	(SSI)‡
5	(—)	Triad	(Adventure International)†
6	(9)	Blue Max	(Synapse)†
7	(—)	Pharoah s Curse	(Synapse)†
8	(—)	Diamonds	(English Software)†
9	(—)	Krazy Kopter	(English Software)†
10	(4)	The Blade of Backpools	(Sirius)‡

*Cartridge 139K Cassette 148K Disc.
(Figures compiled by Calisto Computers Birmingham 021 632 6458)

Vic20

1	(1)	Arcadia	(Imagine)
2	(2)	Wacky Waiters	(Imagine)
3	(4)	Cosmiads	(Bug Byte)
4	(—)	Gorgon II Chase	(Commodore)*
5	(3)	Panic	(Bug-Byte)
6	(—)	Skyhawk	(Quicksilva)
7	(5)	Catcha Snatcha	(Imagine)
8	(—)	Cosmic Crunchers	(Commodore)
9	(8)	Escape MCP	(Rabbit)
10	(7)	Cyclons	(Rabbit)

*Cartridge
(Figures compiled by Boots & Co London)

ZX81*

1	(1)	Space Raiders	(Psion)
2	(2)	Espionage Island	(Artic)
3	(4)	Flight Simulation	(Psion)
4	(—)	History	(ICL)
5	(—)	Geography	(ICL)
6	(3)	Football Manager	(Addictive Games)
7	(5)	1K Games	(Artic)†
8	(7)	Defender	(Quicksilva)
9	(10)	Fantasy Games	(Psion)
10	(8)	QS Scramble	(Quicksilva)

All 16K except where shown †Runs in 1K.
(Figures compiled by Boots & Co London)

Dragon

1	(2)	The King	(Microdeal)
2	(1)	Space War	(Microdeal)
3	(3)	Talking Android Attack	(Microdeal)
4	(5)	Frogger	(Microdeal)
5	(4)	Night Flight	(Salamander)
6	(6)	Planet Invasion	(Microdeal)
7	(9)	Dragon Trek	(Wintersoft)
8	(8)	Champions	(Peaksoft)
9	(—)	Mercoco Grand Prix	(Microdeal)
10	(7)	Cuthbert Goes Walkabout	(Microdeal)

(Figures compiled by Boots & Co, London)

Spectrum

1	(4)	Flight Simulation	(Psion)*
2	(1)	Jet Pac	(Ultimate)
3	(9)	Mad Martha	(Mikrogen)*
4	(3)	Transylvanian Tower	(Richard Shepherd)*
5	(—)	Super Spy	(Richard Shepherd)
6	(8)	Hobbit and the Raiders	(Psion/Melbourne House)
7	(—)	Manic Miner	(Bug Byte)
8	(—)	Test Match	(Computer Rentals)
9	(—)	Arcadia	(Imagine)
10	(2)	Scrabble	(Psion)*

*Requires 48K
(Figures compiled by W H Smith & Blue)

Books

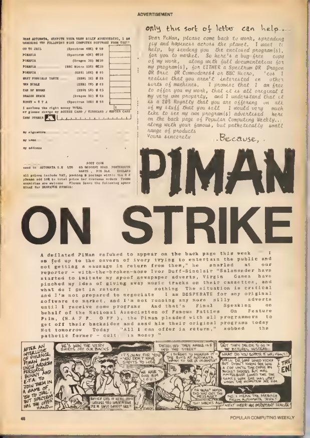
1	(8)	Complete Spectrum Rom Disassembly *Logan*	(Melbourne House)
2	(1)	Commodore 64 Programmers Reference Guide *Commodore*	(Commodore)
3	(2)	Structured Programming with BBC Basic *Atherton*	(Harwood)
4	(—)	Programming the Z80 *Zaks*	(Sybex)
5	(3)	Vic20 Programmers Reference Guide *Commodore*	(Commodore)
6	(—)	Mastering Programming *Rayden*	(Melbourne House)
7	(7)	Assembly Language Programming *Birnbaum*	(Macmillan)
8	(—)	BBC Micro book *McGregor*	(Addison Wesley)
9	(—)	Basic programming on the BBC Micro *Cryer*	(Prentice Hall)
10	(4)	Mastering the Vic20 *Jones*	(Harwood)

(Figures compiled by Watford Technical Books Watford 0923 23324)
(Last week s positions in brackets)

BBC*

1	(—)	Escape from Moonbase Alpha	(Program Power)
2	(—)	Painter	(A+ F Software)
3	(1)	Super Invaders	(Acornsoft)
4	(—)	Danger UXB	(Program Power)
5	(—)	Frogger	(A+ F Software)
6	(3)	Snooker	(Acornsoft)
7	(—)	Philosophers Quest	(Acornsoft)
8	(—)	Alien Swirl	(Program Power)
9	(5)	Countdown to Doom	(Acornsoft)
10	(9)	Killer Gorilla	(Program Power)

*Model B only
(Figures compiled by Micro Management, Ipswich 0473 59181)



DEAR AUTOMATA, DESPITE YOUR VERY SILLY ADVERTISING, I AM ORDERING THE FOLLOWING FINE COMPUTER SOFTWARE FROM YOU!!
GO TO JAIL (Spectrum 48K)
PIMANIA (Spectrum 48K) @£10
PIMANIA (Dragon 32) @£10
PIMANIA (BBC Micro 32K) @£10
PIMANIA (ZX81 16K)
BEST FROM ... TASTE (ZX81 1K)
CAN OF WORMS (ZX81 1K)
DRAGON DEMIE (Dragon 32)
BUNNY + E T A (Spectrum 16K)
I enclose the right money TOTAL £
or please charge my ACCESS CARD / EUROCARD / MASTER CARD
CARD NUMBER
my signature
my name
my address
POST CODE
send to AUTOMATA U.K LTD 65 OSBORNE ROAD PORTSMOUTH HANTS , PO5 3LR ENGLAND
all prices include VAT, packing & postage within the U K please add 10% to total price for overseas orders Trade enquiries are welcome Please leave the following space blank for DESPATCH OFFICER:
only this sort of letter can help...
Dear PiMan, please come back to work, spreading joy and hapiness across the planet. I want to help, by sending you the enclosed program(s), for you to market. So here's a bug free copy of my work, along with full documentation for my program(s), for EITHER a Spectrum OR Dragon OR Oric OR Commodore64 or BBC Micro, 'cos I realise that you aren't interested in other sorts of machines. I promise that I am free to offer you my work, that it is all original & my very own property, and I understand that it is a 20% Royalty that you are offering on all of my stuff that you sell I would very much like to see my own program(s) advertised here on the back page of Popular Computing Weekly.. along with your famous, but pathetically small range of products
Yours sincerely
.Because, .
PIMAN
ON STRIKE
A deflated PiMan refused to appear on the back page this week I am fed up to the cavern of ivory trying to entertain the public and not getting a sausage in return from them," he snarled at our reporter - with-the-broken-nose Ivor Duff-Sinclair "Salamander have started to imitate my spoof newspaper adverts, Virgin Games have pinched my idea of giving away music tracks on their cassettes, and what do I get in return nothing The situation is critical and I'm not prepared to negociate I am DESPERATE for any original software to market, and I'm not running any more silly adverts until I receive some programs And that's Final Speaking on behalf of the National Association of Famous Fatties On Feature Film, (N A F F O FF), the Piman pleaded with all programmers to get off their backsides and send him their original programs today Not tomorrow Today "All I can offer in return," sobbed the pathetic former - cult is money "
AFTER AN INTERLUDE OF VIOLENCE, PIMAN AND UNCLE GROUCHO PERSUADE BUNNY AND E.T.A TO JOIN THEM IN A GAME OF, 'GO TO JAIL', BUT SPECTRUM HAS THE UPPER HAND...
HE'S WON THE VERY SHIRTS OFF OUR BACKS
IT'S OKAY FOR YOU - YOU DON'T HAVE SHOITS TO LOSE
WE HAVE TO GIVE HIM IOUS
DEJECTED THEY AMBLE OFF INTO THE STREET
I FORGOT TO MENTION IT - THE BOYS AT AUTOMATA WANT TO SEE US URGENTLY!
OH YEAH? WHEN DID YOU GET THE MESSAGE?
TWO WEEKS AGO
BUT THEN DECIDE TO GO TO THE PICTURES INSTEAD
WHAT DO YOU SUPPOSE IT WAS, HUH?
WELL DR LONF LOVED VICKY BUT DIDN'T KNOW SHE WAS A COP UNTIL THE CHASE ON ROCKET SKATES BUT MRS AMPLEBUST LOVED THE DOC THAT'S WHY SHE WAS UPSET WHEN THE MONSTER ATE HIM
NO I MEAN THE MESSAGE FROM AUTOMATA JERK!
THE END
NEXT WEEK AN IMPORTANT TRAILER